ARMY ORDNANCE

VOL. XVI, No. 95 MARCH-APRIL, 1936

Military Supply

Harry H. Woodring

Ordnance of the Confederacy, II

Notes of Brig. Gen. Josiah Gorgas, C. S. A.

Preparedness

William O. Hotchkiss

Notes on the Roman Legion

Donald Armstrong

Oil and Our National Defense, II

American Petroleum Institute Committee

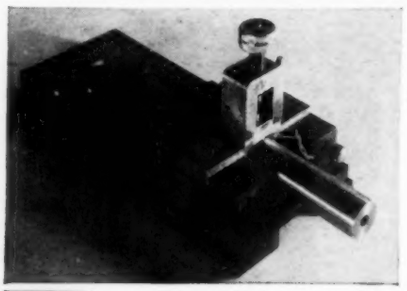
Powerful America

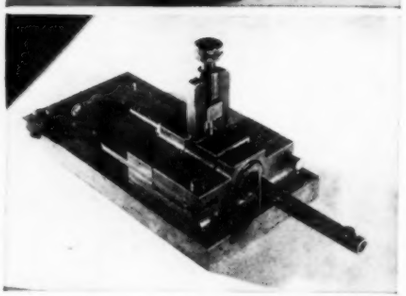
An Editorial

A BIMONTHLY REVIEW OF AMERICAN MUNITIONS
PUBLISHED BY THE ARMY ORDNANCE ASSOCIATION, WASHINGTON, D. C.

RELOADER NEWS

Prepared by the *HERCULES POWDER COMPANY*, Wilmington, Delaware
INCORPORATED





Above: New type of pistol pressure gauge, constructed without gas leak, thus simulating conditions encountered in pistol firing.

Below: An accurate type of pressure gauge for revolver cartridges; the gas leak makes certain that results approximate those usually obtained in firing revolvers.

Accurate Gauges Measure Pistol & Revolver Pressures

Hercules uses two types of pistol and revolver pressure gauges, each of great accuracy, in obtaining ballistic data published in the leaflets available to reloaders.

The newer type of gauge, shown in the top illustration, measures maximum pressure more accurately for pistol cartridges as there is no gas leak in this type. The other type of gauge has a gas leak to approximate usual revolver conditions.

Pressure gauges are used by Hercules:

1. **To determine pressures in chambers of guns.**
2. **To determine maximum pressures that can be used safely.**
3. **To make certain that pressures do not exceed 15,000 lb. (See accompanying article).**
4. **To obtain full information for publication on pressures with different bullets and various charges of the most popular types of cartridges.**

The principle of the pressure gauge is, briefly, as follows: A small copper cylinder of measured length is inserted just above the chamber and held in place by the set screws shown in photographs. The force that drives out the bullet compresses this copper cylinder. The amount of compression is then measured accurately, and, from a conversion table, the pressure in lb./sq. in. is figured. Accuracy is held to about 1,000 lb.

LEAFLETS AVAILABLE

Many leaflets describing Hercules sporting powders and also tabulations of loads for the most popular cartridges are available without cost upon request to Sporting Powder Division, Hercules Powder Company, Wilmington, Delaware. Listed below are the titles of the booklets available:

HiVel No. 2	**.250/3000**
HiVel No. 3	**.25 Remington**
Lightning	**.25/35**
Sharpshooter	**.270 Winchester**
Unique	**.30/30–.30 W.C.F.–.30 Rem.**
No. 2400	**.300 Savage**
Red Dot	**.30–'06**
Herco	**.30/40 Krag**

Bullseye and Unique for Revolvers

FINE TARGET PROVES ACCURACY OF UNIQUE

H. A. Donaldson Makes Perfect Demonstration to Friend

The accompanying target was made by Mr. H. A. Donaldson, of Little Falls, N. Y. It speaks for Mr. Donaldson's holding ability, for his loading skill, and for the quality of the materials he used. The following remarks are from the letter which accompanied the target:

"I read with interest your fine ads, "Reloader News," in the American Rifleman. I do a lot of testing and experimenting; you may have seen my articles and also the data I am sending F. C. Ness for the Dope Bag of the American Rifleman.

"What I want to say is that if more shooters would try your Unique Powder, they would be pleased with the results.

"I have used Unique for some 30 years. It is the powder that gives the best results in reduced loads for the .30/'06, .270 Winchester, .250/3000, and a number of other cases. With Unique there is no comparison.

"I find this so, especially with the gas check bullets. I am sending you enclosed a target I made a few days ago, at 50 yards, to prove to a friend what a fine load I am using in one of my squirrel rifles . . . . . I find Unique to be very reliable and it gives me wonderful accuracy, burning well when loaded loose in the case

"Another thing you should mention in 'Reloader News': I have found in my own testing that your new HiVel No. 3 is the *only powder made* that gives extreme accuracy with the 60-gr. open point, .25 cal. vermin bullet, in such rifles as the .25/35, .25 Remington, .250/3000, .25 Neidner Special, .25 Roberts, and the .25 Krag. Never before have I seen such fine accuracy with high speed with this short 60-gr. bullet."

Why Pressures in Revolvers are Held to 15,000 Lbs./Sq. In.

A chamber pressure of 15,000 pounds per square inch has been the accepted maximum recommended for most revolvers and pistol cartridges for many years. There are good reasons for setting this limit. Most revolvers and their brass cartridge cases were designed before the advent of smokeless powder and were loaded with black powder developing pressures less than 15,000 pounds. Cartridge cases were usually strengthened for smokeless powder so that the pressure level could be raised to 15,000 pounds. Although modern revolvers have been strengthened, cartridge heads are usually unsupported, and there must be a considerable head space or the cylinder will not rotate smoothly, both factors limiting the pressure level.

Revolver cylinders are inherently weak as it is impractical to build large caliber revolvers with as much metal around each chamber as in a rifle.

In automatic pistols, the pressure is limited by the recoil mechanism and by the lack of support of all the cartridge head because of the recess provided for the extractor.

Modern smokeless revolver powders are very quick and sensitive because they must yield all of their energy in a short barrel. At pressures above 15,000 pounds, variations in loading density, crimp strength, bullet diameter and weight, chamber dimensions, primer strength, and seating depth of the bullet have a greater effect on the pressures and may cause dangerous levels to be reached. It is much harder for the hand loader to control variations than for the loading companies, and the reloader cannot check his loads without having special tests made by a ballistic laboratory.

Since chamber pressures control the amount of powder that is safe for a given cartridge, we have published the actual pressures developed by the various charges of our powders so that the reloader may have exact figures, as found in our test guns, to guide him. This information will aid the hand loader to use our powders intelligently and will help him to produce safer and better loads.

Most revolver shooting is done for target practice where accuracy and safety are the first consideration. Best accuracy is usually obtained with reduced loads. They have less recoil and muzzle blast, and are more pleasant and safer to shoot. Where full-power loads are needed, factory-loaded cartridges are desirable. Usually the reloader should stick to reduced loads, developing the best combination to give the greatest accuracy in his individual gun.

HERCULES POWDER COMPANY
INCORPORATED
912 King Street **Wilmington, Delaware**

ARMY ORDNANCE

The Journal of the Army Ordnance Association

Now in its Sixteenth Year of Publication

Pledged to Public Service in Effecting Industrial Preparedness for War as Our Strongest Guaranty of Peace

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"Preparedness usually averts war and usually prevents disaster in war; and always prevents disgrace in war. Preparedness, so far from encouraging nations to go to war, has a marked tendency to diminish the chance of war occurring. Unpreparedness has not the slightest effect in averting war. Its only effect is immensely to increase the likelihood of disgrace and disaster in war."—*President Theodore Roosevelt, "America and the World War".*

The Army Ordnance Association

THE Army Ordnance Association is a national organization of American citizens pledged to industrial preparedness for war as our nation's strongest guaranty of peace.

The Association endeavors to keep alive an interest in and knowledge of the design, production and maintenance of munitions. Other than a few manufacturing arsenals—six in all—there is no peace-time industry for the production of ordnance. Should war unhappily come again, industrial America will be called upon to produce munitions in great quantity and of intricate and unusual design. In an emergency time will not permit careful study or long preparation for the production of munitions. The problem is one of vital concern.

THE Army Ordnance Association believes that the solution of this problem, based on experience, lies in an active organization at all times coöperating with the Government. The principal objective of the Association is an active membership of American citizens, on whom the duty of design and production of munitions will fall in war, who will have an accurate and authentic knowledge of the complex requirements of ordnance. "Peace insurance" in this form is the foremost aim of the Army Ordnance Association.

The Association is devoted solely to the national defense; it has no commercial interests, no political alliances, and no religious affiliations. It is not operated for profit: its income is expended in furthering its aims. Its officers and directors serve without remuneration.

ARMY ORDNANCE, the journal of the Association, is published solely for the purpose of disseminating information on the progress of our munitions developments so that American industry may at all times know its responsibilities to the common defense.

The objectives of the Association as set forth in its Constitution are:

To assist in effecting industrial preparedness for war as being one of the nation's strongest guaranties of peace;

To keep available the highly specialized knowledge necessary for arming the manhood of the nation by stimulating interest in the design and production of ordnance material;

To promote mutual understanding and to effect cooperation with American scientists, inventors, engineers and manufacturers in civil life and the regular and reserve officers of the Ordnance Department;

To provide, when required, the services of competent committees to investigate and report upon special ordnance subjects;

To assist in developing and maintaining an efficient personnel, both commissioned and enlisted, for the units required for Ordnance Field Service in the event of an emergency;

To commemorate the services rendered by the industry of the nation and by the officers and civilian employees of the Ordnance Department in the wars in which the United States has been engaged.

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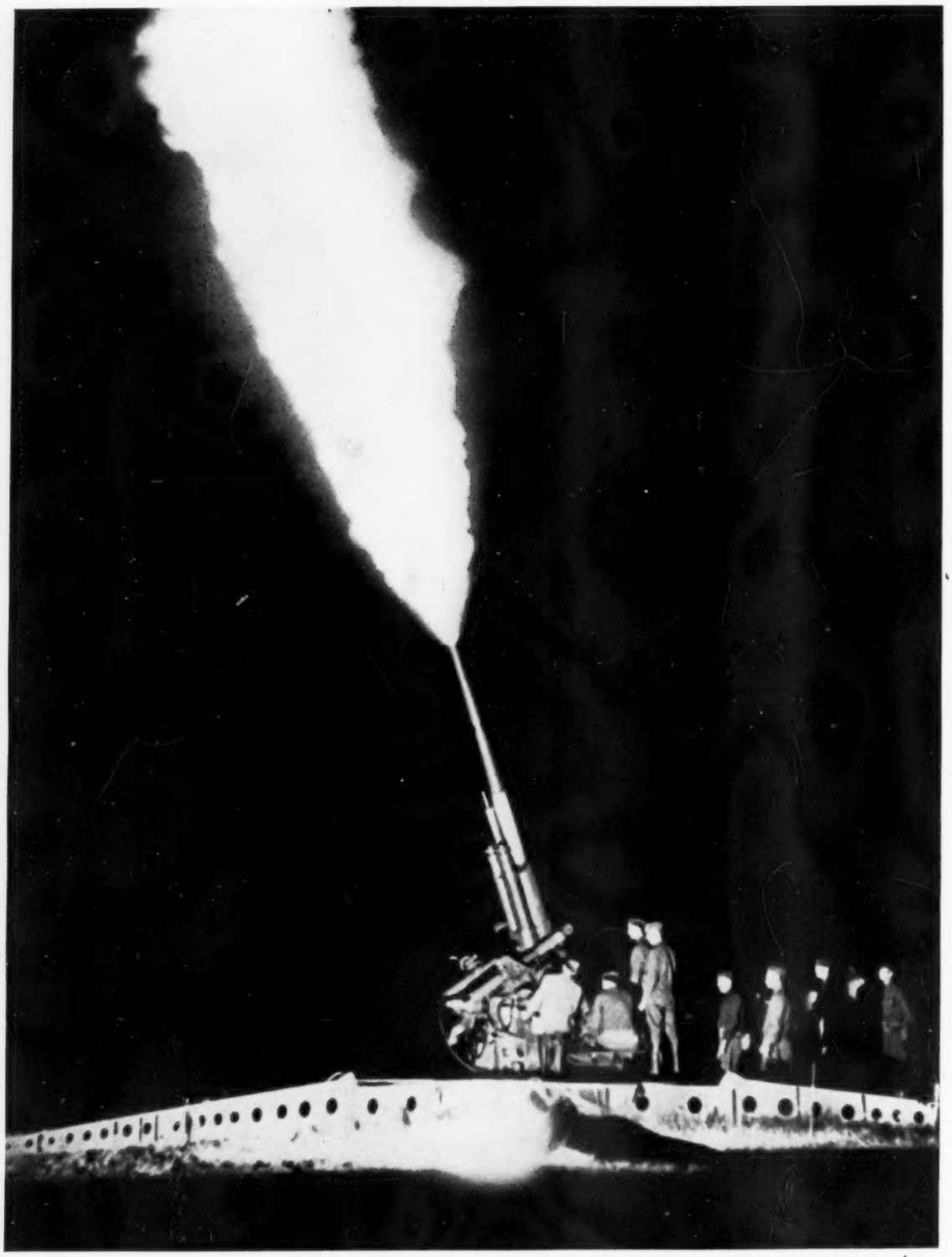

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ANTIAIRCRAFT DEFENSE

NIGHT FIRING BY THE 62ND. COAST ARTILLERY (A.A.)

ARMY ORDNANCE

Volume XVI MARCH-APRIL, 1936 No. 95

Military Supply

Industry Should Be Prepared for Its War Mission

By Harry H. Woodring*

THIS year marks the fifteenth anniversary of the post-World War amendment to the National Defense Act—the charter of our national security. The experience of the years previous to its enactment are embodied in the comprehensive provisions of the act. It gives legislative expression for the first time to the fundamental truth that plans for the mobilization of the material resources of the country must be coördinate with plans providing for manpower. Section 5a of the act places on my office the responsibility for supervising the procurement of all military supplies, and other business of the War Department pertaining thereto; and for the assuring of adequate provision for the mobilization of matériel and industrial organizations essential to war-time needs.

THIS is the Annual Report of the Assistant Secretary of War for the fiscal year 1935. In it are summarized the policies and practices of that part of the War Department which, under the National Defense Act, is charged with the assurance "of adequate provision for the mobilization of matériel and industrial organizations essential to war-time needs."

The author here presents a commentary on fifteen years of Industrial Preparedness—a period of unusual significance to the National Defense of the United States. During the encumbency of Mr. Woodring the principles of industrial mobilization planning have made marked progress as indicated by this modest narrative of splendid achievement.—Editor.

The period since the enactment of this measure has been of such length as to justify the expectation that real progress should have been made in developing an organization to perform the allotted tasks; and in formulating plans, at least workable, although not complete, for an orderly and rapid production of supplies in case of war. It is now possible for me to take stock of what has been accomplished. My review of the work done convinces me that satisfactory progress has been made along lines which should guarantee to the country that our industrial war effort will furnish the necessary military supplies promptly and with a minimum of confusion. While it cannot be expected that the plans will prove perfect in every respect, I do feel that they constitute a carefully thought-out procedure for bringing to bear timely in a national emergency the vast force of our great industrial machine. We have reached the point where increased personnel must be assigned to the task in order to realize on the results already accomplished.

DURING the late period of economic depression some opportunity has been afforded for checking our plans for the procurement of supplies. In my previous report I discussed the satisfactory working of these plans during the mobilization of the Civilian Conservation Corps and the subsequent supply of its units in their work camps. Especially during this past year the War Department and certain other agencies of the Government have been afforded opportunity to check the progress made in preparing the country industrially for war and in improving the methods of procuring military supplies. During this period the findings of the War Policies Commission and the War Department's plan for the mobilization of industry have been under the careful scrutiny of committees of Congress, particularly the Nye Committee. These documents were also studied by a special committee, of which Mr. Baruch was chairman, appointed by the President to make recommendations toward insuring the elimination of profits due to war. It has been a year in which unusual thought has been focused on the industrial phase of national defense. I have welcomed this opportunity to review the progress made in carrying out the task assigned to my office by the National Defense Act. I was particularly glad of the opportunity to obtain the ideas of agencies of the Government outside the War Department and to study them in the process of perfecting our plans for the procurement of war-time supplies and for industrial mobilization. The deliberations of the committees of Congress have culminated in a bill (H. R. 5529), as reported by Mr. Sheppard for the Senate Military Affairs Committee. I am in hearty accord with the spirit behind this bill, despite the possible disadvantage that legislation of this nature may prove premature, in case we realize our hopes that war may be long deferred. Further study as to the details of this bill will be necessary, but I am confident that satisfactory agreement can be reached. Its enactment in suitable form will permit industrial plans to be prepared in a more definite way. If such legislation is in effect when war is declared, control measures can be put into effect without the delay incident to legislative action. I believe the results would be of material benefit to all Government agencies concerned and would assist in making possible the rapid inauguration of the measures necessary to provide an early start for our industrial war effort.

The question of removing the profits from war is naturally one of prime importance to the Government and the people of this country. This question is so intimately linked with

*The Assistant Secretary of War

plans for the mobilization of industry and war procurement that I feel that I should particularly emphasize one phase of it here. It is appropriate, I believe, to state that primarily the object of war is to gain a complete victory, and that to achieve this end, in a war of major proportions, the full production effort of the country will be required. I wish to stress my deepest interest in and sympathy with any reasonable and effective effort to minimize profit in war. While it is highly important that war profit be kept within a reasonable limit, this worthy undertaking must not be allowed to assume any form which, by unfairness to any element of our people and adverse affect on the national morale, will prevent attainment of the vital goal of producing the necessary war materials at the time needed. Time is the critical element; and our Nation must produce the munitions needed as quickly as, or more quickly than, any foe with which it might become engaged in armed conflict.

I AM forced to the conclusion that this country must look to its great private industry for the supply of munitions. In order to make our national defense effective, private industry must be sufficiently flexible to adapt itself to the production of war materials soon enough after the opening of hostilities. It follows that American industry should be prepared to perform its war mission. This means that industry should be given munitions work in time of peace, for any plant that has once produced munitions is thereafter better qualified to produce the same munitions in war. I feel impelled to emphasize the importance of obtaining legislation which will permit the War Department, in time of peace, to place educational orders, so that selected industries may actually produce, before the emergency arises, a limited amount of the kind of matériel assigned them for war manufacture. Under the present laws requiring competitive bidding, no assurance can be given that any selected plant could receive such educational orders. If industry is to be expected to get into quick production of war materials, some assistance of this nature must be given by the War Department in time of peace.

Another important element of the control of profit in war is that dealing with contracts. In former emergencies competitive bidding for the products of industry by the procurement agencies of the Government and by the civilian population sent all prices into a rapidly ascending spiral. The normal peace-time relationship between seller and buyer was reversed, so that instead of manufacturers being forced to lower prices in competition for business, they were induced, and at times almost compelled, to raise prices as normal production capacity was approached and exceeded. The urgent need of munitions, noncommercial in character, often caused the placing of ill-considered contracts, which resulted in undue profit to contractors. As a part of the program to limit the war profits of business concerns to fair and reasonable amounts, I realize the importance of developing a contract form and contractual procedure which will accomplish the desired results. To this difficult problem the Planning Branch, assisted by the Navy and other Government agencies and the voluntary efforts of representatives of labor and industry, has applied itself. Procurement planning has now progressed to the point where definite decisions should be made respecting the contractual procedure in the event of a war emergency.

Proposed forms for war contracts have been in existence for a number of years, but were never formally approved until recently. During the year, the board of officers appointed for the purpose of standardizing the form of war contracts made an intensive study of the forms that had been revised in 1931. Changes recommended by this board were embodied and the forms as finally recommended have been approved. It is not intended that approval will terminate the study of war contract forms. Free comment and criticism have been invited from the supply arms and services as well as from the Navy Department. It is intended to revise these forms annually if necessary. Although the contract forms have been approved, this phase of procurement planning is still in the development stage in regard to fixing the conditions under which the various forms will be used, the method of selecting contractors for evaluated-fee and adjusted-compensation contracts, the procedure for fixing the price in fixed-price negotiated contracts and the provisions to be made for contract review.

ONE of the most important problems which has caused some concern in the preparation of plans for industrial mobilization is the definite concentration of industry in the northeastern section of the country. This concentration has resulted in a heavy war load being placed on the procurement districts of that area. From a strategical viewpoint this is unfortunate. I have had this condition studied during the past year and I have become convinced that it will be impossible for many years, at any rate, to ameliorate the situation to any great extent. For various reasons industry has grown and developed in certain sections of the country. The War Department must of necessity accept generally the present geographical location of industry. However, I have had regulations adopted that will require the supply arms and services to utilize to the utmost the industrial facilities of other sections of the country.

Another important project which is under my supervision is providing adequately for launching the emergency industrial construction and conversion program immediately after the war emergency has been declared. The steps, of course, include the adoption of a program, the preparation of a detailed plan, the working out of a proper construction organization, and the development of policies governing the procurement and distribution of critical building materials. During the year my office received from the supply arms and services data showing the proposed scope and location of each major project. These projects must be coördinated and priorities established on the basis of command decisions. This problem is now being attacked and we can confidently expect during the next year definite progress toward insuring the rapid construction and conversion of the necessary war-time facilities.

The procurement planning of the War Department has disclosed the probability of serious shortages in certain items of equipment. Requirements in the abstract are determined solely by military considerations. As a practical matter, however, the requirement figures used as a basis for war procurement must take into consideration the productive capacity of the country. Under these circumstances, requirements must, of necessity, be revised to the end that all available capacity is utilized in the production of those items most needed for the success of the military effort. Some progress has been made in the adjustment of requirements and this will be continued. Heretofore, the policy has been followed of allocating individual manufacturing facilities to particular supply

arms and services. A considerable number of these are allocated to supply arms and services requiring only a small part of the potential plant capacity. It is exceedingly important that this excess capacity be utilized in war. Accordingly, I have initiated steps to correct this situation. A method of procedure for dividing allocated facilities between the Army and Navy also has been put into operation. Progress is necessarily slow, but it may be anticipated that an equitable division of facilities between the Army and Navy will be achieved within a reasonable time.

The Industrial Mobilization Plan covers the necessary procurement supervision and also provides for the organization of agencies for the mobilization of all industrial elements of the Nation in support of the military program. However, the plan contemplates that these central agencies will be operated by civilian personnel appointed by and responsible to the President. It is contemplated that the War Department will step aside from participation in super-agency control of national resources and thereafter devote itself to its own war effort. However, there is a very important period between the declaration of war and the time when full super-agency control is attained. A plan to bridge this period has been prepared. This plan is based on the assumption that the Army and Navy Munitions Board, a permanent peace-time body, will form the nucleus for the War Industries Administration. I am glad to report that this Board has been very active during the year. It has made unusual progress in solving the problems for which it was created, as the co-ordinating agency between the War and Navy Departments in planning for war-time supply.

THE Army Industrial College has had another successful year. The graduating class comprised 52 officers of the Army, Navy, and Marine Corps. In the work of my office on planning for war procurement and industrial mobilization, which necessitates the closest and most cordial relations with the Navy Department, a truly coöperative spirit between the officers of the sister services, as fostered in the Industrial College, is, I am happy to say, becoming increasingly more apparent.

During the past year the policy of the War Department was modified so as to make possible an increased output of trained officers from the higher tactical and strategical schools of the Army. I believe the Army Industrial College should receive a corresponding increase in its student body. The total number of those graduated from this institution up to date approximates 500—only a very small proportion of the number which will be needed in an emergency. The size of the student body of the Army Industrial College has not only been too small to satisfy the real needs of the service, but it has been particularly deficient in furnishing a sufficient number of officers of the arms trained in planning for procurement and for industrial mobilization. In order that procurement may be properly handled in time of war, it is essential that not only those in authority over the supply side of the war machine, but those in charge of the command side as well, should have a very definite knowledge of procurement and industrial problems. In order to provide for this, proper training must be given in time of peace to a sufficient number of officers so that, if and when war does break out, there will be available for assignment to key positions enough of our best officers—both line and supply—who have been educated to understand the importance and difficulties of the mass procurement of military equipment and supply. The building of this pool of trained officers requires time and a continuing policy of sending sufficient officers to the Army Industrial College each year.

The policy of my office controlling current procurement for the Regular Army and the Civilian Conservation Corps, which I outlined broadly in my last report, has been continued successfully with but few minor changes. Purchasing operations for the Civilian Conservation Corps have been consolidated at large depots at corps area, district or regional headquarters where personnel experienced in purchasing is available. This method has not eliminated the local firms from competing for the business of nearby camps. In order to carry out the policy of assisting in the rehabilitation of business, whenever possible, bids, especially those covering perishable subsistence supplies for the requirements of the camps, have been solicited from local firms. The former system for inspecting meat and meat products of the Civilian Conservation Corps, which had been carried on in coöperation with the Bureau of Animal Industry, Department of Agriculture, was discontinued and replaced by a system operated by the Veterinary Corps of the Army under the supervision of the Surgeon General. The volume of this class of Civilian Conservation Corps inspection work became so large that the Bureau of Animal Industry could not carry on its regularly assigned work and it asked to be relieved from this additional task. The scope of the inspection was widened to include dairy products. The system under the Veterinary Corps now covers plant inspection and the post- and ante-mortem inspection of animals at the plants as well as inspection at destination. At all times the Bureau of Animal Industry coöperated whole-heartedly in efforts to furnish the Civilian Conservation Corps with the best meat and meat products at a reasonable price. The helpful assistance of the Bureau well merits the thanks of the War Department.

During the greater part of the year, with the large increase in Government purchases, my office has been working in close harmony with the National Recovery Administration. My instructions, I believe, have resulted in my office coöperating to the fullest extent with that agency in carrying out the provisions of the Executive order requiring bidders for Government business to submit with each bid or quotation a code compliance certificate and further requiring the inclusion of code compliance provisions in contracts. With relatively few exceptions, incompleted contracts were promptly ordered cancelled by my office whenever it was determined by the Administration that the contractors involved were violating applicable codes. The administration of the order caused some delays in the purchase of supplies but in most cases they were of minor importance. Naturally, certain exemptions from some of the provisions of the Executive order became necessary and some time was lost before these applications for exemptions by the War Department could be acted upon. Even though firms involved in certain cases had been reported as code violators, it became necessary, in order to expedite delivery of supplies, to continue to make awards and to accept deliveries under contracts—otherwise the demands of the Civilian Conservation Corps could not have been met in time. At the very end of the year the code compliance provisions were withdrawn from Government contracts due to the decision of the Supreme Court that these provisions were not enforcible. This materially reduced the contact between my office and that of the National Recovery Administration.

All contracts for the purchase of products covered by the Agricultural Adjustment Act contained a clause requiring the contractor to comply with approved marketing agreements and licenses. The clause provided for the cancellation of a contract if it was determined that the contractor was violating any applicable marketing agreement or license. This caused no difficulty whatsoever in connection with War Department contracts.

DURING the past year I have given much time and thought to the carrying out of the policy for the procurement of military airplanes and accessories which I outlined in my report of last year. I have taken special care to assure the legality of my procurement policy under the act of July 2, 1926. I have studied closely the results of this procurement policy during the past year and find that it has materially aided the rapid development and progress of military aircraft and has permitted efficient procurement of airplanes to meet the needs of national defense. Although the War Department is desirous of procuring the finest available airplane of each type, I have had the matter of cost carefully examined to insure that the Government is not being required to pay excessive prices therefor. Where examination of cost data indicates that such an airplane is excessively priced, I have had steps taken to obtain this airplane at a price in line with what the Government experts find to be reasonable. I believe that this policy is giving full rein to the inventive genius and engineering ability of the manufacturer and permits the incorporation of all worthwhile development in the sample to be submitted practically up to the actual date of opening the bids. If advertising had been based upon detailed specifications and drawings with no incentive for turning out the finest type of airplane, it is fair to assume that proposals would have been received offering airplanes meeting only these detailed specifications and drawings and not including therein the engineering developments which have taken place since the issuance of the specifications many months before.

The making of awards under this system on the basis of a tested article rather than on a "paper promise to perform" has had an additional marked advantage. It enables the War Department to make contracts for quantity procurement with the knowledge that the manufacturer has actually demonstrated his ability to construct the finest available type of airplane, thereby eliminating the total service test of an article, which would be necessary if samples were not required. This factor alone reduces by at least a year the elapsed time between the inception of a design and delivery of airplanes in quantity to troops in the field and eliminates to a great extent criticism, made heretofore, to the effect that airplanes were becoming obsolescent by the time they reached the hands of tactical organizations. I believe it is fair to say that progress in the art of design has been advanced at least 2 years by this system.

I have been gratified to find that this competitive policy of procurement has resulted in increasing the available sources of supply for the different types of airplanes. In addition to quantity procurement competition, design competitions are being held on many types of aircraft. I am happy to be able to report that the response of the aviation industry to the new procurement policy has been most gratifying. Competition on standard equipment has been keen and has resulted in a considerable increase in the amount of engineering research on the part of manufacturers. In some cases manufacturers are offering airplanes whose performance exceeds expectations. It appears reasonable to assume that no such advance would have been made at one stroke without the incentive of competition and the assurance that award would be made to the manufacturer offering the most advanced plane.

PRACTICALLY no changes have occurred in the character of the non-statutory duties assigned to me. For the first time since 1931 the National Matches were provided for by Congress. These matches are a culmination of the assistance rendered each year by this office to approximately 87,000 civilian marksmen throughout the country. These matches focus the attention of rifle marksmen on the importance of rifle shooting. They bring together, in a competitive match, men from all components of the Army and civilians as well. A point of contact is thus established that has most happy results. They also serve to prepare a nucleus of potential instructors in case of emergency and to bring to the attention of the citizens of the country the importance of rifle shooting as a part of military preparedness. The matches are to take place in the early fall. I shall, therefore, furnish you in my next annual report an outline of the events, with any constructive criticisms and recommendations which I have to make.

In conclusion, I wish to emphasize again the importance of a continuous, progressive and comprehensive planning for industrial preparedness. This is a vital element in national defense and involves matters affecting the economic life of the entire Nation. The rapidly changing conditions of the past few years, and the increased interest of Congress and of the country, have focused the attention of my office on the extreme importance of keeping up-to-date our plans for the mobilization of industry in an emergency. Although the progress made along these lines has been most gratifying, I most earnestly recommend that this activity be fostered and strengthened by the assignment of additional personnel. The personnel now assigned to these duties represents the minimum. I believe that the importance of industrial planning is taking its rightful place in the minds of those in authority and with the combined efforts of the interested parties directed toward the improvement of this phase of national defense, it leaves no doubt in my mind but that the gratifying progress already attained will continue in the years to come. In no lesser degree does this apply to our methods of conducting the current business of the War Department. I am impressed with these facts and have insisted that those in my office keep them constantly in mind. Consequently, the coöperation of other Government departments has been sought as well as the constructive ideas and assistance of industry in general. I am happy to say that only the most cordial relations exist—a condition which is so necessary to the successful carrying out of the duties assigned to my office.

Oil and Our National Defense

II. Petroleum Production and Supply

By The American Petroleum Institute Special Committee on Production and Supply*

THE commercial supply of crude petroleum is derived from underground sources and the quantity which can be produced is ultimately limited. Consequently attention has been periodically directed to this natural resource with a view to obtaining some idea of the magnitude of the reserve supply. Apprehension has occasionally arisen as to the adequacy of the underground reserve. During the past 20 years no less than eleven official inventories have been made, with results that are striking in two respects: each estimate, upon superficial examination, has indicated that the supply of petroleum was meager when compared with current annual consumption; and later estimates have usually run higher than those earlier made.

It is the purpose of this report to appraise the petroleum supply of the United States in the light of current knowledge. Domestic supplies of crude petroleum fall into three categories: first, that which has been extracted from the earth and is held in above-ground storage; second, that which is already discovered and partly developed, but which is held in underground storage—the proved reserve; and, third, that which awaits discovery—the future reserve.

IN the January-February 1936 issue of this Journal Messrs. Brooks and Snider contributed an article under the above title in which they presented some aspects of petroleum shortage in the United States. Herewith is published a concluding analysis of the subject prepared by a special committee of The American Petroleum Institute.

Readers of ARMY ORDNANCE *will be interested in both viewpoints because of the importance of our petroleum reserves in peace and in war. With oil and other economic sanctions so generally in the public mind today as a weapon for the prevention or termination of hostilities it is important that the present and future status of our own raw material reserves be given factual consideration. That is to say, national policy regarding raw material sanctions must take into account our own exigencies as a possible belligerent no less than as a neutral.*—EDITOR.

TABLE I

STOCKS (IN BARRELS OF 42 U. S. GALLONS) AT BEGINNING AND END OF YEAR AND DEMAND FOR CRUDE OIL IN THE UNITED STATES FOR DOMESTIC AND EXPORT USE, 1920–1934

(Authority: United States Bureau of Mines)

Year	*Stocks, Beginning of Period*	*Stocks, End of Period*	*Demand in United States for Domestic and Export Use*
1920	149,356,000	(a) 167,289,000	531,171,000
1921	(a) 149,448,000	217,324,000	529,671,000
1922	217,324,000	(a) 306,811,000	595,352,000
1923	(a) 295,708,000	(a) 376,615,000	733,515,000
1924	(a) 340,637,000	(a) 361,655,000	770,697,000
1925	(a) 360,475,000	(a) 343,820,000	842,222,000
1926	(a) 345,863,000	315,029,000	862,090,000
1927	315,029,000	379,660,000	894,881,000
1928	379,660,000	(a) 391,869,000	969,032,000
1929	(a) 392,629,000	428,445,000	1,050,440,000
1930	428,445,000	(a) 408,809,000	979,776,000
1931	(a) 411,882,000	(a) 370,919,000	939,294,000
1932	(a) 370,194,000	(a) 339,715,000	860,320,000
1933	(a) 339,875,000	(a) 355,312,000	922,112,000
1934	(a) 354,223,000	337,254,000	960,592,000

Note.—(a) Stocks at end of period do not always agree with figures shown for beginning of following period because revisions are many times made as of the end of the year without carrying the revision back through all preceding years. Figures at the beginning and at the end of each year indicated are, however, on comparable basis.

Stocks of crude oil held above ground represent the immediately available supply upon which the industry relies to feed its refineries. The amount of oil so carried has tended to increase as the industry has grown in size. This inventory, expressed in terms of the time taken to turn it over, is constantly varying, but has rarely exceeded an amount which would meet demand for 6 months. (Stocks of processed oil have usually represented an additional several months' supply.) Its size is determined by cost and by practical experience. It is purely a working supply and is constantly replenished from underground sources.

Stocks of crude oil carried by the industry during recent years are shown in Table I.

The increasing size of the proved reserve is the result of the vigor of exploration. Reserves resulting from new discoveries have thus far, in the aggregate, exceeded production by a widening margin. The absolute size of the proved reserve at any given time does not, however, carry the significance often attributed to it. The proved reserve is of the nature of a working stock and, as such, should not be needlessly large. To view it as an indicator of the volume of the future supply is erroneous, for the specific size of the proved reserve can offer no dependable clue to the quantity of oil which is yet to be discovered.

With these considerations in mind, we have not only estimated the oil available in known fields but have dealt with the dynamic elements of supply inherent in the rapid progress now under way in the science of petroleum geology, the art of discovery and the technique of production. These are opening to commercial utilization large resources which were a few years ago beyond reach.

TABLE II lists estimates by states of proved underground reserves of petroleum in known fields, as of January 1, 1935. In preparing these estimates careful consideration was given to data obtained from numerous reliable sources, particular weight being attached to estimates made by men especially familiar with the various fields or districts. These data had already been gathered and analyzed through a period ranging from several months to several years. These estimates represent petroleum which may be extracted by ordinary current methods of production under prices prevalent on January 1, 1935. They do not include an indeterminate quantity of oil left in the ground by present producing methods, but which may be extracted by advanced methods of production, such as water drive, under prices higher than those existing.

*J. Edgar Pew, Dallas, Texas, Chairman, assisted by an eminent staff of past presidents of the American Association of Petroleum Geologists and 22 other geologists, geophysicists and engineers.

TABLE II

Estimated Proved Petroleum Reserves in Known Fields as of January 1, 1935, in Millions of Barrels*

California		3,500
Rocky Mountain States		
Wyoming	250	
Montana	60	
Colorado	12	
		322
Central and Southern States		
New Mexico (S.E.)	350	
Texas	5,500	
Oklahoma	1,200	
Kansas	400	
Arkansas	75	
North Louisiana	55	
Coastal Louisiana	320	
		7,900
Eastern States		
Illinois	35	
Indiana	5	
Kentucky	35	
Michigan	45	
New York	40	
Ohio	30	
Pennsylvania	240	
West Virginia	25	
		455
Total United States		12,177

*A few states with very small reserves have been omitted.

During 9 months since January 1, 1935, new discoveries and some notable extensions of fields already discovered have greatly increased the known underground reserves. Up to the present time (September) in excess of 40 new fields have been found this year. Although it is not yet possible to make accurate estimates of these new reserves, it is safe to say that they will probably total well over 1.25 billion barrels for the year.

In 1921 the United States Geological Survey and the American Association of Petroleum Geologists coöperated in making an estimate of reserves based on indications at that time.[3] The figure was 9.15 billion barrels for the United States, 5 billion barrels being "oil in sight" and 4 billion being "prospective or possible."

In 1925 the American Petroleum Institute published an estimate [4] of reserves in producing and proved fields. Its total was 5.321 billion barrels.

In the report of the Cole Committee,[5] an estimate of 13.36 billion barrels was published as the reserve in known fields on January 1, 1934.

The estimates of 5 billion barrels in the 1921 and 1925 reports, the estimate in the Cole Committee report, and the present estimate of 12.177 billion barrels, are intended to cover essentially the same class of reserve, that is, the "blocked-out" oil in fields already discovered by drilling.

Proved reserves of crude petroleum are essentially a stock stored underground against the time when the immediate needs of the industry require it to be brought to the surface. Such reserves are as definitely a part of the working stocks of the industry as oil stored in tanks. While the volume of such proved and partly developed reserves must be stated as an estimate, the accuracy of estimation is, in the opinion of your committee, sufficiently high that the industry may rely on this oil being available when required. The fact that the production of this oil must necessarily be extended over a long period of years, and that it would be uneconomical and wasteful to attempt to produce it in a comparatively short time, does not in any way impair the concept that proved reserves constitute such an underground inventory. It is constantly being augmented by new discoveries and depleted by lifting the oil to the surface.

This relationship is depicted in the accompanying graph (Fig. 1). The upper curve shows the accumulated total of

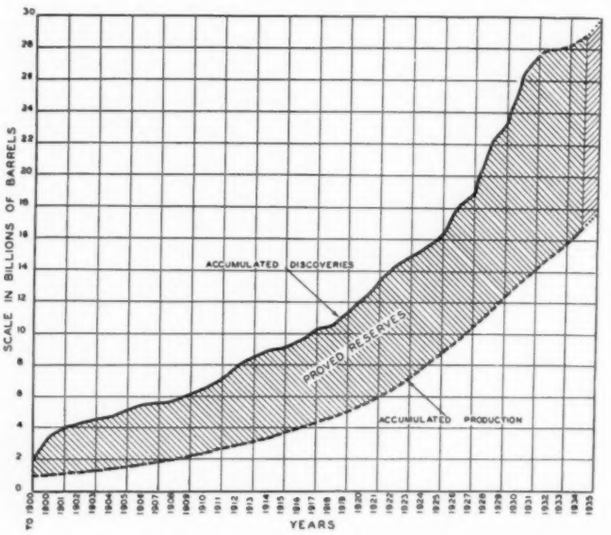


Fig. 1. The Relation of Our Petroleum Reserves and Production

petroleum discovered as of the first of January of each year since 1900. The figures for these discoveries have been revised as far forward as possible, so that until about 1931, they reveal with fair accuracy the reserves available at the particular date as later proved by subsequent development of the fields included. From 1931 forward these estimates become less exact because the more newly discovered fields are not fully defined. For 1935, for the same reason, only a trend can be shown.

The lower curve on the graph shows accumulated production year by year, starting in 1900. The shaded area lying between the curves thus indicates the volume of proved reserves as of the dates indicated. The striking fact illustrated is that the shaded area (accumulated discoveries less accumulated production) has been expanding since the beginning. Had it not been for the exceptionally great reserves added by Kettleman Hills and East Texas in 1929 and 1931 respectively, this separation of the two curves would have been nearly uniform. After a temporary set-back from these exceptional increments, the trend of the curve of discoveries is in 1935 again away from that of the production curve. As has been the case in most of our history, reserves are now being discovered at a rate greater than the rate of production. In the 10-year period from January 1, 1925, to January 1, 1935, during which total production amounted to about 8.69 billion barrels, more than 13 billion barrels of oil were discovered.

NEW oil pools are found only by the drilling of wells. All geological and geophysical work serves only to indicate the existence of traps—of underground conditions suitable for oil accumulation. Whether or not oil is present in commercial quantity in an apparently suitable trap can be determined only by drilling. Indeed, oil deposits of great magnitude have been and are at present being discovered by random drilling.

[3] "The Oil Supply of the United States," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 6, No. 1 (January-February, 1922), pp. 42-45.

[4] *American Petroleum Supply and Demand* (Amer. Petrol. Inst.). McGraw-Hill Book Company, New York (1925), p. 59.

[5] *Petroleum Investigation.* Hearings before a subcommittee of the Committee on Interstate and Foreign Commerce, House of Representatives, Seventy-Third Congress (Recess) on House Resolution 441, September 17-22, 1934. Part 2. "A Résumé of the Geology and Occurrence of Petroleum in the United States," by the United States Geological Survey, p. 1081. Washington, D. C. (1934).

There is no fixed formula for discovery and, important as our advanced and advancing technique of prospecting may be, we are nevertheless indebted for a large part of our reserves to discoveries made by the thousands of wells drilled at random. Not only new pools but occasionally new regions and new types of pools are discovered through ventures regarded as too risky to attract the sophisticated prospector. Even among the most experienced technical men there is often diverse opinion as to whether a particular prospect may be attractive enough to justify the expense of drilling. Out of this diversity of opinion and out of the hundreds of independently directed efforts at prospecting, come discoveries which easily bulk great enough to be the critical and determining factor in maintaining proved reserves adequate for our national requirements.

PROSPECTING, because of the high rate of consumption of petroleum products, is the continuing business of the oil industry to a degree not paralleled in any other mineral industry. Even in times of over-production and with excess of developed reserves, the prospecting effort must continue if the needs of the future are to be met.

The art of prospecting being inexact, the volume of oil discovered is not directly proportioned to the effort put forth to find it. Consequently, under our existing laws, the industry is at times harassed by excess oil pressing for market as a result of the discovery of some large pool, while at other times the public is apprehensive as to the adequacy of our reserves.

There is no precise measure of the magnitude of the prospecting efforts put forth by the entire industry, including the smaller units which may be formed for the drilling of a single well. Much information is available, however, and indicates that at present the effort is at a rate which costs between 200 and 300 million dollars annually. The average overall cost to the industry of finding a barrel of oil, over a long period of years, appears to be between 30 and 50 cents. For the successful wildcatter, this cost may be almost nothing. The costs of many successful companies are above this minimum estimate. The lower figure of cost has been exceeded for long periods by important and successful companies. On the whole, however, the estimate seems to be a fair one.

During the first half century of the oil industry, prospecting was almost wholly a matter of random drilling. It was guided, if guided at all, by proximity to oil or gas seepages, existing wells or pools, or by vague considerations such as physiography, trends, etc., having some geological significance. While this type of effort continues to be a substantial part of prospecting effort, a more rational technique based on geology began to be commonly accepted by the industry about 1913-15. Much of the prospective oil territory was thereafter examined and the surface geology mapped with considerable exactness. Subsurface studies were then organized and, by about 1920, the possibilities of the then existing technique were fast becoming unable to meet the demands of the industry because the more definitely expressed structures had been explored to the drilling depths then practicable.

About this time, and as the result in part at least of war demand and high prices for oil, a number of decided improvements and advances in the art of prospecting were introduced which permitted more exact and refined geologic investigation and the examination of areas not amenable to exploration by older methods. Among these advances in geologic technique were the introduction of core drilling for structure, improved coring practice in well drilling, the introduction of micropaleontology and detailed examination of well samples, aerial mapping, and geophysical surveying, particularly by gravity and seismic methods.

Since 1920, there has been progressive improvement in technique and accumulation of more exact and detailed geologic knowledge of the regions in which most future reserves will be found. The geophysical methods have been improved and extended. Electrical logging has been introduced. The depths to which prospect wells can be practicably drilled have been substantially increased. The development of the East Texas field has emphasized the volumetric importance of oil occurrences in which stratigraphic rather than structural conditions are the controlling factor and suggests that much future effort may be directed toward search for pools of such type. Generally as a result of improved prospecting technique, the quality of prospects available to the industry today is better than that of the prospects of ten years ago.

As to the future—geophysical methods are comparatively new, are susceptible to continuing improvement and afford possibilities of discoveries of revolutionary importance. No examining technique yet developed is definite and final. Consequently, improved techniques of greater resolving power open to reëxamination areas which have been surveyed again and again by less effective methods.

LARGE areas within the United States, underlain by sedimentary rocks, are only partly explored for oil reserves, whereas the areas already explored by the best current methods are relatively small. No satisfactory method has been found for assigning a numerical estimate to the amount of oil recoverable from undiscovered deposits. The oil to be discovered in the future is so concealed from observation that an estimate of ultimate reserves in terms of barrels is obviously impracticable. However, we do have a definite, although incomplete, knowledge concerning the existence in an important part of these slightly explored areas of extensive deformation in sedimentary rocks which are productive in neighboring districts, of deeper prospects, and of other geologic factors which are favorable to the occurrence of oil. This gives reason to expect that ample discoveries will be made to meet national requirements for a period of indeterminate length. There is no evidence that discoveries will not continue to be made for many years.

Since the beginning of the oil industry in the United States, discovery has provided sufficient reserves for the industry. During the last decade an estimated 13 billion barrels of oil recoverable by flowing and pumping methods have been found. The amount of oil discovered has strikingly exceeded earlier predictions. Furthermore, technical progress has been rapid and has provided knowledge as to the occurrence of oil which gives added assurance of future discoveries of comparable quantities of new reserves. When the exploration work and drilling required for the discovery of these quantities of oil have been completed, further possibilities will be revealed, the extent of which can not now be predicted.

No discussion of the supply of crude petroleum is complete without consideration of advances in drilling and production practice. Methods of drilling for and extracting oil have been so greatly improved that there is little doubt that their almost universal application is resulting in the recovery of a

far greater part of the total store of oil than the methods of the past. It is noteworthy that the greatest advances in production technology have been made in the last 15 years, and today technical improvement continues at an accelerated rate.

PERHAPS no advance has been more important than the increase of knowledge concerning the conditions governing the occurrence of oil. The fanciful ideas prevalent in the early days that oil was found in underground lakes and streams have been replaced by a fundamental knowledge of the character of the reservoir rocks. It is now known that the rocks in which oil is stored vary greatly in texture and porosity. In many places oil, itself charged with gas, occupies a zone in the rock overlain by free gas and underlain by water. Gas, oil, and water alike are confined under great pressure. When wells penetrate the oil-bearing portion of the reservoir this pressure tends to drive the oil out of the reservoir to the surface. There has been an increasing realization of the importance of using this energy as an agency for oil recovery. Wherever possible, gas that would formerly have been wasted is now held in the reservoir to drive oil to the wells, while water, thought to be the greatest menace a decade ago, is now regarded as a powerful agent for the expulsion of oil.

In the practical field, the industry has attacked with the greatest thoroughness the problem of deeper and faster drilling. Variety and efficiency of drilling tools have made it possible successfully to penetrate formations which formerly all but defeated the efforts of the driller. Improved coring devices make it possible to obtain complete sections of the rocks penetrated and to determine with increasing precision the location of possible reservoirs. Devices for surveying and determining inclination of wells have made it possible to drill straighter holes and thus reduce wear on equipment and frequently to prevent loss of wells. Intensive studies of the composition of drilling fluids have greatly aided in the control of wells and the prevention of blowouts. These and many other improvements have enabled the industry to find sands which with cruder methods frequently escaped detection and to explore to increasing depths in search for lower sands and new pools.

Methods of completing wells have also been greatly improved. Cementing procedure now permits the sealing off of gas sands overlying oil sands so as to conserve gas pressure. Effective shut-off of water sands prevents the flooding of oil sands, which has in the past rendered much oil irrecoverable. Selective perforation of casing opens only those parts opposite oil zones, leaving barren zones and those containing water cemented and unperforated. The proper handling of the fluids found in underground reservoirs has undoubtedly led to the completion of many wells as producers that in the earlier stages of the industry would have been abandoned.

In every step connected with the drilling and finishing of wells the advances made in the design and manufacture of equipment have more than kept pace with the requirements of the driller. Not only are the major units, such as derricks, boilers, and pumps, of much heavier design and manufacture, but all forms of tubular material have reached a standard of strength and reliability that permits the reaching of greater depths without failure of equipment. It may be safely stated that equipment now available is capable of drilling to depths of 15,000 feet whenever the industry shall consider wells of such depth commercially desirable.

The tendency of oil-producing methods in use today is to recover an increasing proportion of the oil originally contained in the reservoir. Flowing wells are regulated to limit the amount of energy used to extract each barrel of oil, thus conserving reservoir energy to be utilized in further extraction. Mechanical improvements in equipment for pumping permit the lifting of oil from increasingly greater depths. Loss of production by the gradual sealing of the oil sands and by many other factors that develop during the operation of wells has been materially reduced by new methods, and this has resulted in the salvage of large quantities of oil.

The proper handling of oil at the surface is now a totally enclosed process. The old methods of open production and storage are obsolete except as to heavy oils produced with little or no accompanying gas.

METHODS of secondary recovery are of growing importance. Maintenance of reservoir pressure through return of gas or by the injection of air results in greatly increased recoveries. Restoration of reservoir energy in declining fields by similar methods has led to increased production. Water drive is being used effectively to flush from sands oil which can not be recovered by pumping. Complete extraction of the oil stored within a reservoir never has been and probably never will be achieved, but the advances referred to and others, such as acidizing, give assurance that the wider application of these methods will result in reclaiming large quantities of oil left in the reservoirs by earlier production technique. To the extent that it is economically possible to apply these methods, the supply of available oil will be increased.

The petroleum resources of the United States are a finite though indeterminable quanity. Its reserves, in the sense of petroleum commercially available, are a variable quantity, less than the total resources, but approaching them with increase in price. The reserves of motor fuels, both supplementary supplies and those manufactured from the petroleums, are determined by price and, at prices well within the ranges of the past, are available almost without limit.

The American petroleum industry has led the world in increasing recovery from discovered pools through improved production practice, and in increasing motor-fuel reserves both through improved refining practice and the development of the natural-gasoline industry. This has resulted in a general level of prices for petroleum products in the United States never high enough for any long period to justify sustained efforts to develop the production of substitutes in quantity.

The production of motor fuels in quantity in the United States from sources other than the petroleums waits upon necessity rather than invention. Great advances have been made, even in spite of a long period of low world prices for petroleum, by nations less favored than our own with regard to petroleum reserves, in which, because of requirements of national defense or desire for economic independence, it has seemed desirable to develop substitutes as an independent source of supply.

From the viewpoint of current or anticipated requirements, the coal reserves of the United States and of the world are practically unlimited. Coal has therefore received considerable attention as a source of substitutes for petroleum and, with the help of government protection, is at present supplying a large part of Germany's requirements of liquid fuel as well as lesser amounts in England, France, and Belgium. Benzol, a coal product, already finds world-wide employment as a motor-fuel constituent. In 1933 about 1.4 million barrels

of benzol, representing approximately 0.33 per cent of the total gasoline production, because of its antiknock properties, was used for blending with motor fuels in the United States. In the United Kingdom, benzol represented from 2 to 3 per cent of the motor fuel consumed, and in Germany it is estimated that more than 0.25 of the motor-fuel requirements could be supplied by benzol made in existing coke ovens.

The benzol of commerce is today obtained largely as a by-product of the high-temperature coking of bituminous coal. In addition, considerable quantities of other light-oil derivatives, coal tar, and by-product gases, are produced. With industrial coke consumption at the 1929 high level and all bituminous coal employed for domestic heating replaced by coke, the total by-products, if fully used, could provide substitutes for approximately 30 per cent of the petroleum requirements of the United States. Expansion of high-temperature coking operations to supply the bulk of our requirements for liquid fuel appears hardly feasible, however, and other processes exist which are preferable.

Low-temperature carbonization of coal has never proved very popular in the United States because the liquid products must sell in competition with cheaper petroleum products. The liquid products obtained are considerably greater in volume than those from high-temperature coking, the gas formed is less in amount but of a higher heating value, and the coke formed is unsuitable for metallurgical use but more suitable for domestic use than high-temperature coke. Low-temperature carbonization is well established in Great Britain and is carried on extensively on the European continent. It is probable that it will supply the United States with petroleum substitutes in the future but that the amount will be limited by demand for the coke.

The hydrogenation of coal to gasoline has been successfully developed on a commercial scale. Plants with a capacity exceeding 8 million barrels of gasoline per year are operating or are under construction in England and Germany. When operating for maximum production of gasoline, the yield is about 65 per cent by weight on the ash- and moisture-free basis of coal charged. It is important that no by-products are formed for which a market must be found. Normally a cost of 10-15 cents per gallon may be expected, depending on coal and labor costs, rate of amortization of investment, taxes, etc. In England gasoline from coal is sold profitably in competition with the petroleum product with the assistance of a subsidy of 8 pence per gallon. Hydrogenation produces 90-140 gallons of crude oil per short ton of coal and is a promising method for obtaining motor fuel from coal. The oil equivalent by hydrogenation of the coal reserves of the United States is measured in thousands of billions of barrels.

The oil shales of the United States are second in importance to its coal reserves as a source of petroleum substitutes. Their use on any broad scale seems farther off today than it seemed in 1925 when the Report of the Committee of Eleven on American Petroleum Supply and Demand was submitted. At that time the shale reserves were estimated at 394 billion short tons from which about 108 billion barrels of shale oil could be recovered.

Alcohol, because of its unsuitability for extensive use in motor operation and its excessive cost as compared with other substitutes, is not likely to prove an important factor in any country having ample coal reserves.

Other petroleum substitutes have not been developed to the point where their merits may be evaluated with accuracy.

Conclusions: 1. The proved reserves as of January 1, 1935, are estimated at 12,177,000,000 barrels.

2. The proved reserves, since the beginning of the modern petroleum industry in the early 1900's have generally increased yearly and have at no time been abnormally low in terms of the Nation's requirements.

3. The various estimates of future reserves which have been made from time to time during the past score of years have almost without exception proved to be too low, many of them absurdly low.

4. The discovery of the oil fields from which our past production has come, and in which our proven reserves exist, has been achieved by multiple effort of great variety, ranging from the efforts of skilled scientists and technicians to that of adventurous speculators.

5. There is no method of estimating definitely our future reserves of petroleum, but there is a sound basis for belief that they are of substantial proportions in terms of the estimated annual requirements.

6. The magnitude of the proven reserve of petroleum, and of the reserves that may reasonably be expected to be discovered in the future, is such that there is no indication of any imminent danger of a petroleum shortage.

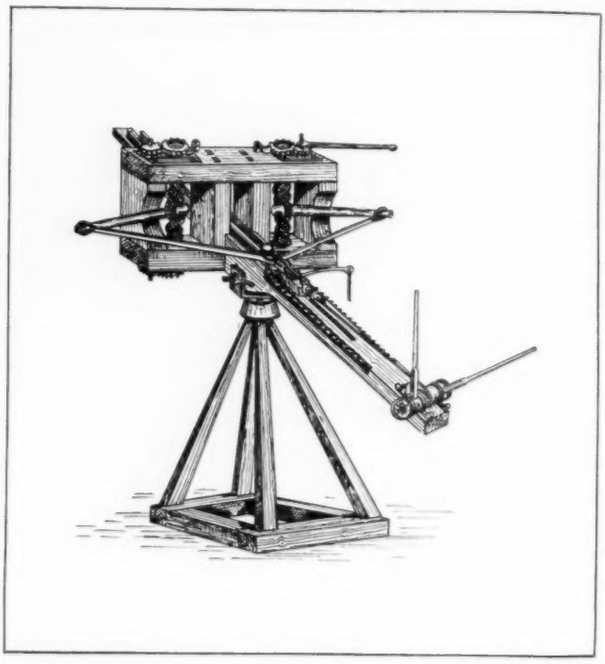
7. Whenever in the future it appears that the supply of petroleum is becoming definitely limited, ample supplies of motor fuels for many generations will be economically obtained from such substitutes as coal and oil shale.

Notes on the Roman Legion

The More Things Change, the More They Are the Same

By Donald Armstrong*

IN the year 200 A.D. a Roman soldier named P. Pompeius Capranius was honorably discharged from the ordnance detachment of the Third Legion.[1] This event in the life of an obscure legionary is known to posterity because of the fortunate Roman habit of recording on commemorative monuments many circumstances in the annals of the legions and in the careers of their officers and men. Archaeologists have found not only a multitude of such inscriptions, but also numerous records written on papyri, preserved for nearly two thousand years in the dry climate of Northern Africa. From these sources as well as from the commentaries of Caesar, the histories of Tacitus and Josephus, the works of such military writers as Frontinus and Vegetius, and from such modern interpreters of epigraphic material as Cagnat in France and Parker in England, we can piece together a fairly satisfactory picture of the organization, training, and the conditions of service in the Roman Army. The study of Roman military history will be far more significant if we can answer such questions as: How was the Roman legion organized and trained; from what sources did the officers come and how were they promoted; how were the men recruited; how did the ordnance service function; how were the other supply functions carried out; what about pay and retirement; what staff duties were performed? This paper will be an attempt to answer these and other queries briefly, but it is hoped, with sufficient clarity to prove once more the fundamental verity of the maxim *"Plus ça change, plus c'est la même chose."*



After Payne-Gallwey

THE BALLISTA

"A ballista is operated with cords made of sinews. The longer the arms of the ballista, i.e., the larger it is, the greater is the range of the darts. If the machine is well constructed and aimed by skilled men who have previously determined the range, it penetrates whatever it hits." (Vegetius, III, 22.) The ballista discharged heavy arrows or stone balls of about 6 lbs. weight with a maximum range of approximately 500 yards.

LET us return for a moment to our ordnance soldier Capranius. The organization to which he belonged should be referred to properly as Legion III Augusta, the cognomen indicating that the Legion was formed under Augustus. In the year 200 A.D. this Legion had passed about two hundred years on foreign service in Northern Africa and had built for itself a magnificent permanent camp at Lambaesis where many remains have been discovered. Capranius held a military rating that was engraved on the stone that bears his name. This was *polio,* meaning literally a "polisher" or probably more correctly a "sword maker". In this capacity he worked in the *fabrica* or ordnance repair shop where swords, spears, javelins and the Roman artillery, consisting of ballistae and catapults, were repaired and kept in condition for service and inspection. His title suggests that our expressive, if inelegant, term "spit and polish" had its counterpart in the Roman Army. This rating was apparently not easy to win, for we have another inscription immortalizing one M. Antonius Pietas as a *discens polionem* which can be translated as "learning to be a polisher or sword maker." That a period of apprenticeship was necessary in the training of the ordnance soldier of antiquity need not surprise us when we reflect that the holder of such a rating must have been an expert in heat-treating steel and in making and repairing the sharp-edged infantry weapons. He had to be skilled in making the parts of the catapults and ballista, especially in preparing the twisted sinews, hair, or rope that were the Roman substitute for powder in the artillery, to say nothing of the important requirement of polishing equipment until it dazzled the eyes of the inspector general, or even the emperor himself. The Roman ordnance service will be discussed in greater detail in considering the supply and maintenance of the Roman armament.

Five or six hundred years before Capranius obtained his rating as "polisher", service in the Roman legion was a privilege reserved to Roman citizens. As a matter of fact, only a portion of the citizenry could qualify for membership in this exclusive group. The proletariat couldn't belong at all, for eligibility was determined by possession of a certain degree of wealth and the peasant proprietors alone could become fighting men. Nor were foreigners admitted to the ranks of this restricted military organization. Rome's rise to

*Chief of the Maintenance Division, Field Service, Office of the Chief of Ordnance, Lieutenant Colonel, Ordnance Department, U. S. Army.

1. M. René Cagnat, *"L'Armee Romaine d' Afrique"*, p. 192.

Drawn especially for this article by Capt. Fred P. Todd, New York National Guard

A BALLISTA IN ACTION

power was naturally accompanied by a broadening of the basis of recruitment of her military forces. The upper classes in the time of Marius finally accepted the proletariat as soldiers. Even foreigners began to serve Rome's military might, but were still excluded from the legions. These foreign mercenaries were called *auxilia* and their units formed an integral part of the Roman army. The Gallic cavalry in Caesar's army is a well known example of such *auxilia*. There were also light armed infantry, slingers and bowmen among the auxiliary troops, who did not bear the brunt of battle, but were used for such missions as foraging, raiding, and pursuit of the enemy. These *auxilia* were commanded by Roman *praefecti*, and in action were posted on the wings of the army. The Philippine scouts in our own Army bear a close resemblance to the Roman organization of native troop units.

The Roman army, therefore, passed through an early stage of armed forces raised by annual draft on the peasant proprietor class. This militia was ultimately replaced by a professional army. The liability of all citizens for military service remained, and conscription was practiced to fill the legions, but voluntary enlistment finally became the usual method of obtaining recruits.

THE long period of the civil wars that followed the assassination of Caesar was succeeded by the beneficent rule of Augustus. In the "Annals of Rome" by Dio Cassius [2] (A.D. 150-235) Maecenas urges the victorious Augustus to maintain a permanent standing army of legions, composed of Roman citizens, and of *auxilia* or mercenaries raised from the subject nations and allies, to be distributed throughout the provinces as necessity required. He continues: "And these men ought to be always under arms and make a practice of warfare continually. They must have safe winter quarters at the most suitable points, and serve for a definite time, so that a certain period of active life may remain for them before old age. For, separated so far as we are from the frontiers of the empire, with enemies living near us on every side, we cannot rely on forces called out for the occasion. If we allow all those of military age to have arms and to undergo military training, civil wars will always be arising among them. But if we prevent all military activities and then need their assistance in battle, we shall always have to face danger with inexperienced and untrained soldiers at our back. For this reason I propose that most of them live without arms and away from camps; but that the hardiest and those most in need of a livelihood be registered and trained. They will fight better by devoting their time to this single business. The rest will the more easily farm, manage ships, and attend to the other pursuits of peace, if they are not forced to be called out for service but have others to stand as their guardians."

The remarks ascribed to Maecenas contain many interesting views. His objection to universal service because of the consequent risk of civil war is an illuminating indication of the political condition of that period. He wanted to make military service attractive by the inducement of retirement

2. Dio, "Annals of Rome". 52, 27.

before old age, and he would only recruit the strong and the penniless. We shall look into this question of pay and retirement later on. At any rate Augustus adopted the principle of the professional army for imperial defense in preference to a citizen militia.

The internal organization of the legion itself remained unchanged, and can best be shown by means of the following table:

Unit	*Nominal Strength*	*Average Strength*
Legion	6,000	3,600
Cohort	600	360
Maniple	200	120
Century	100	60

Drawing by Capt. Fred. P. Todd

AQUILIFER—ARMY OF THE RHINE

The legion resembles the American division in that it was the elementary organic unit of the combined arms in the Roman army. Vegetius' remarks on the self-sufficiency of the Roman legion[3] is a description of what a basic military organization of this kind should be: "A well-ordered legion resembles a strongly fortified city, since it always carries everything that is needed for a battle. It never fears a sudden attack of the enemy, since it is always ready, even on the open field, to throw up a protecting barrier around itself on a moment's notice. Furthermore, it has in its ranks all types of soldiers and of weapons."

In addition to the infantry shown in the preceding table, there was apparently a unit of cavalry (120 men) attached to each legion. Where are the engineers and the artillery? It would seem that the engineers (*fabri* to the Romans) were certain designated legionaries who were expert in road and bridge building and fortification. In those days the soldier could be with some success an all-purpose man who fought either as an infantryman or artilleryman or performed the technical duties of the engineer. If we examine Vespasian's order of march[4] in his invasion of Judaea, we shall have an excellent idea of the distribution of the legionary units and attached forces, marching in the presence of the enemy:

Advance guard: 1. Light armed infantry and bowmen from *auxilia;* "to prevent any sudden assaults from the enemy and to search out the woods that looked suspicious and were capable of ambuscades." 2. Detachment of Roman infantry and cavalry. 3. Engineers, to fortify the camp and "to make the road even and straight." 4. Vespasian's baggage and that of his generals, protected by cavalry detachment.

Main body: 1. Vespasian and bodyguard of picked infantry and cavalry. 2. 120 cavalry belonging to legion. 3. Artillery. 4. C.O. of legion with his cohort commanders. 5. Legionary standard or *aquila.* This "eagle" was sacred to the legion. 6. Trumpeters. 7. Legion, marching six men abreast. 8. Baggage of legion carried by pack animals, wagons and servants.

Rear guard: 1. Auxiliary troops. 2. Picked legionary infantry and cavalry.

THE tactics of the legion are so well known that no attempt will be made to describe its method of fighting and the use of its weapons other than a brief reference to the employment of artillery. Ordinarily the use of the ballista, catapult and onager are assumed in siege operations, but the participation of field artillery in a war of movement is less familiar. A few examples will show a modern conception of the use of the Roman long range weapons (600-800 yds. maximum range). In 57 B.C. Caesar was in contact on the Aisne near Berry au Bac with a greatly superior force of Belgae. The Roman army took up a position parallel to the river, the left flank well protected by a marsh, the right flank in the air. To strengthen his right, he dug a trench "at right angles to his front line about 400 yards long. At the ends of the trench he built redoubts in which he posted his artillery."[5] Two years later Caesar used his catapults and ballista to cover his landing in Britain and found these weapons most effective against enemy morale. In a campaign against Bellovaci he writes that "he posted his line of battle in a position from which the projectiles of the artillery could be discharged into the wedges of the enemy."[6] When Caesar's Ninth Legion was attempting to fortify a most important hill near Dyrrachium in the Civil War, Pompey forced the retreat of these men by bringing up his artillery on a neighboring hill and opening fire on them.[7]

To conclude these examples of the use of field artillery, probably the earliest instance of artillery concentration is told in this lively narrative by Tacitus[8] of one of the battles in the struggle for the throne in 69 A.D.: "Antonius had meanwhile called up the Guards to reinforce his wavering line. Taking up the fight, they repulsed the enemy, only to be repulsed in their turn. For the Vitellian artillery, which had at first been scattered all along the line, and had been firing on the bushes without hurting the enemy, was now massed on the highroad, and swept the open place in front. One immense piece of artillery which belonged to the Fifteenth Legion, mowed down the Flavian line with huge stones. The slaughter thus caused would have been enormous had not two of the Flavian soldiers performed a memorable exploit. Concealing their identity by snatching up shields from among the enemy's dead, they cut the ropes that suspended the weights of the weapon. They fell immediately, riddled with wounds, and so their names have perished. But of their deeds there is no doubt."

THESE examples of the early use of field artillery are given in some detail because of the general misunderstanding of the role of the field artillery in ancient warfare. The citations have shown the effectiveness and power of the artillery in the pre-Christian and early Christian era. They refute such statements as that of Dodge[9] in his "Caesar" where, describing the changes in organization during the early

3. Dorjahn and Born, "Vegetius on the Decay of the Roman Army", Classical Journal, Dec. 1934.
4. Josephus, "The Jewish War", III, 6, 2.
5. Caesar, "Gallic War", II, 8.
6. *Ibid.* VIII, 14.
7. Caesar, "Civil War", III, 45.
8. Tacitus, "The Histories", III, 23.
9. Dodge, "Caesar", p. 771.

centuries of the Christian era, he writes: "Artillery began to accompany the legions. . . . At first this purported to be only for use on the walls of the permanent camps. But later, in the third century, the onager or smaller ballista was transported on a two-ox cart, and the hand ballista on a one-horse wagon. Each was served by eleven men. They were placed in line of battle, between the legions, to save these from too sudden or close contact with the enemy."

This monohippic artillery appeared far earlier in the line of battle and for purposes other than siege operations as the facts abundantly prove. Moreover, Trajan's column shows gun carriages (*carroballistae*) in use in the first century of our era and we may safely assume that earlier models of a similar type were used by Caesar's army. At a later date it is known definitely that the legion had, in theory at all events, an organic artillery of 55 pieces.

The supply of artillery and of infantry weapons and armor and their maintenance in the field is another subject ordinarily neglected in Roman military history. Although there is no record of government munitions plants in the late Republic or early Empire, such establishments must have existed from an early date. Later records show that raw materials needed for the manufacture of arms, especially iron, were demanded of the various provinces of the Empire as taxation in kind. There is also extant a list of the arsenals themselves, giving their distribution throughout the Empire and indicating that, like our own arsenals, each one was specialized in the production of some particular type of weapon.[10]

FOR supply and maintenance in the field, the Roman legionary camp had a staff officer known as the *praefectus castrorum,* the prefect of the camp. He was a combined ordnance and engineer officer, and constructing quartermaster. His responsibilities included maintaining the vehicles in the combat trains, and providing entrenching tools. Further, he "was charged with the responsibility of seeing that there was no lack of battering rams, onagers, ballistae and other kinds of artillery."[11]

What provision was then made to enable this glorified ordnance officer to carry out his mission? Under his direction[12] "the legion has carpenters, builders, wood workers, iron workers, painters, and other skilled workers (such as the 'polishers') for constructing permanent camp buildings, for manufacturing artillery, for building wooden towers (for sieges) and other things. The function of this personnel was to manufacture infantry weapons and armor, vehicles, and all kinds of artillery, or to repair damaged matériel." His establishments included an ordnance warehouse and an ordnance shop. The ordnance warehouse was known as the *armamentarium* and the repair shop was called the *fabrica.* In the warehouse were stored individual equipment, such as javelins, spears, shields, etc., manufactured in the government arsenals, and also artillery and ammunition. The ordnance warehouse was commanded by a centurion who was assisted by a junior officer in charge of the building itself and the matériel stored in it. A certain number of clerks were assigned to keep the records of matériel received and issued. The personnel on duty at the warehouse was entirely distinct from the non-commissioned officers, known as *custodes armorum,* who are frequently cited in the military lists found in Africa. It is known that these "ordnance sergeants" were distributed among the different cohorts under the orders of the centurions and that they were apparently responsible for the weapons drawn from the warehouse and assigned to each century. They were charged with the maintenance of the matériel and were responsible that it was always in good condition and in case of loss or damage, to have the arms replaced or repaired.

The men on duty in the *fabrica* or repair shop were known as *fabri* and a junior officer, the *optio fabricae,* directed the shop and was charged with the details of its operation.

It further appears from lists of personnel taking part in campaigns that the men assigned to the *armamentarium* stayed at the depot while those in the *fabrica,* at least in part, accompanied the legion or its detachments in the field. The personnel of the *fabrica* thus corresponds closely to the ordnance maintenance personnel of the present day.

Drawing by Capt. Fred. P. Todd

LEGIONARY—DACIAN CAMPAIGN

THERE is no justification for the belief that the ordnance personnel of two thousand years ago had no technical problems to solve. Constant improvements were made in defensive armor, and the technical development of infantry weapons is well known from contemporary accounts. For instance, the actual hand-to-hand combat was preceded by a shower of javelins hurled at the enemy at a range of twenty or twenty-five yards. Various measures were adopted to make it impossible for the enemy to pick up these weapons and throw them back on the advancing lines much as the early hand grenades were picked up and hurled back by the recipients in the World War. The final modification was adopted by Caesar with the success described in the Gallic War[13] where he reports in these words the effect of the volley of javelins that pierced the Gallic shields: "and as the iron became bent, they could not draw the weapons out nor could they fight handily with the left arm encumbered." The ensuing defeat of the Gauls was effected to some degree because of a technical improvement in ordnance matériel. To accomplish this result the Roman arsenals had left untempered the metal of the shank of the javelin beneath the head so that the impact of the javelin on the shield bent the iron. It is easy to understand how "encumbered" the enemy would be in his efforts to fight with a shield pierced by a javelin that could not be pulled out. It would be entertaining to pursue the investigations of the technical improvement in Roman weapons, but space does not permit.

The Roman military forces have been referred to as "an army commanded by amateurs". This statement[14] is no

10. Cagnat, p. 406.
11. Vegetius, II, 10.
12. *Ibid.* II, 11.
13. Caesar, "Gallic War", I, 25.
14. Parker, "The Roman Legions", p. 193.

exaggeration for the commanding officer of the legion was a *legatus* whose amateur status was unimpeachable. Caesar apparently originated the practice of assigning a *legatus* to command a legion and this became the standard usage under Augustus. These legion commanders were usually of the senatorial order with little or no previous military experience. That the Roman army achieved such eminent results cannot be attributed to its *legati*. The explanation would seem to lie in the sound organization of the Roman army to meet its tactical problems and to a greater extent in the soldierly qualities and military experience of the centurions or captains who commanded the centuries or Roman companies.

THE backbone of the legion was to be found in the centurions who commanded the sixty centuries. There were various ways by which the centurions were originally appointed, and the method and speed of promotion seems to have varied with their origin. If a centurion rose from the ranks his promotion was slow, but if he had been appointed a centurion from the equestrian order, or if he were a centurion appointed to this grade from among the retired veterans, recalled to the colors, he rapidly advanced to the senior grades of this rank. For the centurions were promoted through a rather complicated series of grades from the lowest centurion in the legion, therefore, the sixtieth in order of rank to the chief centurion or *primipilus*. It appears that the centurions promoted from the ranks advanced slowly through the sixty successive grades of the centurionate. Promotion by selection took place as a special reward, but the appointees from the equestrian order jumped many intermediate steps in reaching the top. The senior centurion in each cohort was the commanding officer of the cohort. The century had junior officers, called *optiones,* as well as other designations that need not concern us here.

The enlisted men of the legion served as a rule for a period of twenty years before they were entitled to retirement. Their methods of garrison training were so similar to our own that they need not be described in detail. Their military training, like our own, was interspersed with various special duty assignments and fatigue. In a papyrus found in Egypt[15] there are such assignments as *stationes,* or daytime guards at headquarters; *vigiliae* or military police; men who cleaned weapons *armamenta* under the direction of the ordnance sergeant; latrine orderlies, *ad stercus,* strikers who cleaned the centurion's Helius' equipment *ornatus* and boots *calceamenta;* men on kitchen police who were sent out for food and wine.

The pay received by the soldier had certain stoppages against it, such as (a) the cost of his weapons and armor on original enlistment, (b) cost of his food, and (c) his clothing and bedding. Savings accounts for the soldier were encouraged in order that the soldier might have a fund available on retirement. A translation of the pay account[16] found in an Egyptian papyrus illustrates clearly the system of remuneration. The soldier's name was Q. Julius Proculus Damascenus. In the first pay period of the year he was credited with 248 drachmae. His account follows: *Received,* dr. 248, *Deductions:* Bedding dr. 10, Food 80, Boots 12, Annual camp dinner 20, Soldiers Burial Club 4, Clothing 60, Total 186. Deposit in savings account 62.

This soldier was obviously more inclined to thrift than another we know of whose letter home has been preserved through the ages on a bit of papyrus.[17] He wrote: "My dear Mother: I hope that this finds you well. On receipt of my letter I shall be much obliged if you will send me ten dollars. I haven't got a penny left because I have bought a donkey cart and spent all my money on it. Do send me a riding coat, some oil, and above all my monthly allowance. When I was last home you promised not to leave me penniless, and now you treat me like a dog. Father came to see me the other day and gave me nothing. Everybody laughs at me now, and says 'his father is a soldier, his father gave him nothing'. Valerius' Mother sent him a pair of pants, a measure of oil, a box of food, and ten dollars. Do send me some money and don't leave me like this. Give my love to everybody at home. Your loving son."

This letter suggests that the penurious soldier is no modern phenomenon and explains why the state compelled the soldier to deposit one half of any bonus granted during an enlistment in the savings bank "so that it would not be wasted for luxuries or by his comrades in the purchase of useless things."[18]

Since the soldier's pay was only a little over forty dollars a year, it is not surprising that it was augmented by booty won in war, and by gifts and bonuses in peace. On discharge, especially, the soldier received a large bonus, sometimes in money, sometimes in land, occasionally in both. Perhaps the feeling of our former soldiers that they are entitled to a bonus may be the modern manifestation of an old Roman custom!

ONE last piece of archaeological evidence[19] throws more interesting light on the immutability of human nature. About July 1st, 129 A.D., the emperor Hadrian inspected the crack Third Legion in Northern Africa. Its commanding officer, the *legatus,* undoubtedly proud of his organization, nevertheless, gave many reasons why the legion was unable to make a better showing, and his explanations have a very modern ring. The legion paraded in honor of the emperor and afterwards carried out maneuvers, on conclusion of which the emperor addressed the assembled troops in these congratulatory words: "My Legatus has made every possible excuse in your favor. He asked me to note that one of your cohorts was away on detached service, the one sent to the proconsul, as is done by roster every year; that less than three years ago you furnished your comrades of the Third Legion (probably the Third Legion known as Gallica) an entire cohort and four men from each century to complete their effectives; that you are scattered in all directions for the defense of the province; that within the last fifty years you have twice changed garrison, and twice had to build a new permanent camp. It might well be considered pardonable if all these things had interfered with your training. But it does not appear that this is the case and you really have no need of indulgence on my part. You have given every proof of the greatest vigor in maneuvers and while you were defending the rampart . . . ." Unfortunately the remainder of the inscription is illegible but no more is needed to prove that "the more things change, the more they are the same," or in the words of Ecclesiastes that there is nothing new under the sun.

15. *Ibid.* p. 226.

16. *Ibid.* p. 217.

17. *Ibid.* p. 221.

18. Vegetius, II, 20.

19. Cagnat, p. 159.

Preparedness

We Should Face the Future with Realistic Minds

By William O. Hotchkiss*

I ALWAYS object to sailing under false colors. I like a straight-forward statement. I admire and trust a man to whom I can apply the terms: honest, true blue, rock-bottomed integrity; and in my poor human fashion, I try to be worthy of having those terms applied to me. So I shall try to set myself right at the beginning of this brief discussion, since there seem to be lots of foolish people who believe that preachers and college presidents are possessed of final wisdom on all subjects. I want to disabuse the reader's mind if he has any notion that this college president has expert knowledge of military affairs, or foreign policy, or peace movements. I pretend to no special insight into these things; I should be regarded properly as a common, ordinary citizen who reads the papers and tries to do a little thinking on his own in good citizenship fashion.

Just to show how inexpert the author is I will have to confess that he was obliged to go to the dictionary to find out whether he was a pacifist or a militarist. He found out that he was neither in some senses, and in others, that he was a combination of both. This helps to substantiate my claim that tonight you are listening to a talk on preparedness as viewed by an ordinary citizen.

I have heard many arguments and read many discussions on "Preparedness". They are usually by people who seemed to think they knew all about it. Each writer seemed to think the virtue was all on his side and that those who didn't see eye to eye with him were villians of the deepest dye. If the writer was against militarism, his opponents, as he pictured them, were vicious men who gloried in butchering people and in all the pillage and destruction associated with war. If the writer favored preparedness, the opponents at whom he levelled his spear, were white-livered milk sops who would sit supine while cruel, rapacious enemies robbed and murdered them and their families.

NO matter what our views, we like to divide all people into two great groups. We call them friends and enemies. Those who have the God-given inspiration to believe as we do, are our friends. Those who have the devil-born perversity to believe differently, are our enemies. We actually enjoy being intolerant of the other fellows views when they don't agree with our own. If we believe in preparedness, the man who does not, is classed as a miserable pacifist to whose description we can joyously apply all the adjectives we know denoting weak, soft-headed, pusillanimous, cowardly. If we do not believe in preparedness, the man who does we picture as a bloodthirsty militarist who believes in and actually revels in murder, war and destruction. We like to think that all the God-like qualities are possessed by those who think as we do, and that all who think otherwise are inspired of the devil. All of this illustrates the psychological truth that we like to think emotionally.

It has been my good fortune to know and work with and talk with men of many ranks. I have worked in mills and on farms and have known well the people there. I have known men in both low and high political office. I have numbered amongst my close friends, men of the highest financial standing, and men whose finances were measured by a small weekly pay check. I have been fortunate in knowing men in military affairs from buck privates to major generals and cabinet secretaries. Among them all I have never met a man who would admit to being an unqualified pacifist or an unqualified militarist. Each one would admit, in accordance with his leanings, that he was militarist "only to this extent" or that he was "pacifist to the degree of believing so and so."

So, as has been remarked in the great state of New York in days gone by, "Let's read the record." Let's get down to brass tacks and see what we are talking about.

WHAT is militarism and what is pacifism? Here is the dictionary's verdict: "Militarism: Predominance of the military class or *prevalence* of their ideals; subordination of the civil ideals or policies of a government to the military; the spirit which exalts *military virtues* and ideals; the policy of aggressive military preparedness." "Pacifism: Opposition to war or the use of military force for any purpose; especially an attitude of mind opposing all war, emphasizing the defects of military training and the cost of war, and advocating settlement of international disputes entirely by arbitration; also, the system of beliefs or opinions opposing war or the use of military force."

As I look over these, I must decide I am not wholly either a militarist or a pacifist. As I read the definition of pacifism, I find I agree with the first part "opposition to war," but as I read on and find that to be a pacifist, I must be opposed to the "use of military force for any purpose," I must emphatically disagree. Further on where the definition says, "advocating settlement of international disputes," I find myself a pacifist again, in that I believe in advocating this in the hope that it may ultimately be realized. So I must admit that I am a sort of half-breed pacifist.

As I read the definition of militarism, I find that I do not believe in the "predominance of the military class," nor in the "subordination of the civil ideas or policies of government to the military." When I come to that part of the definition which says "the spirit that exalts military virtues" I pause and ask myself what are military virtues. I think of courage and loyalty and patriotism and devotion to duty and the intelligent submission to duty, and I find mysef enthusiastically militaristic in this part of the definition. So I must admit that I am a sort of half-breed militarist as well as a half-breed pacifist.

When I have reached this conclusion, I find with pleasure that this is the viewpoint of most of those I have met. All the military men I know, from Secretary of War and major general to buck private, belong in my class, along with the great majority of seldom articulate civilians. The ardent proponents of the opposing sides fade into insignificance, and the controversy between "militarist" and "pacifist" becomes recognizable for what it is, a largely futile academic discussion.

*President, Rensselaer Polytechnic Institute, Troy, New York.

Both sides of the discussion, however, can cheerfully unite in a common purpose to minimize the probability of war. This is a purpose we can all agree upon. We all want peace. The objective of the advocate of preparedness is to insure peace, and the purpose of the advocate of disposing of all our arms and our battleships is also to insure peace. The real basis of difference between the two ideas, it seems to me, is simple. Anyone with ordinary human contacts and experience is capable of reaching an intelligent decision if he will forget his usual practice of thinking emotionally and use a little hard common sense in analyzing the situation.

WE all want peace. What are the ingredients from which we must make it? On what foundation can we build it? Again let's look at the record. There are two general items in the record that I want to call to your attention. Both are fundamental to peace. The first is the question as to ourselves and our fellow men. What are our motives? How do we think and act? The second is the question as to the facts of history.

There are two long lists of words that describe human behavior. One is made up of words describing good qualities. The other is made up of words describing evil qualities. Every word is true of each human being in some degree—both the good words and the evil—because we are all mixtures of both qualities. We are, at times, humble, meek, kind, generous, helpful, friendly, logical, charitable, peace-loving, and forebearing. We are also, at times, proud, overbearing, emotional, cruel, selfish, angry, murderous, hateful, rapacious, envious, warlike. Each one of us has more or less of all these qualities within himself at times. Even the best of us has evil qualities and even the worst of us has good qualities.

We desire peace. We reëlected President Wilson on the logical slogan, "He kept us out of war." In a few months our emotions were at high pitch and we went to war with all the high patriotic fervor of a holy cause.

As to the facts of history, we have had important wars in 1776, 1812, 1848, 1865, 1898, and 1917. The longest interval of peace was from 1812 to 1848—36 years. Every generation in the United States has had its major war. Every generation has gone to war with patriotic fervor and high emotions. Every generation has been terrified and horrified by war and devoutly prayed that they, and all future generations, might be delivered from war. Each generation has given its best effort to make provision that there should be no more armed conflict between men. And yet each generation has had its major war.

When I consider the kind of human beings we are—all the good and evil that makes up our very being—and when I consider our history, my common sense tells me that the evidence is conclusive that human beings have not yet acquired sufficient wisdom to find a way to do away with war. Much as I dislike the prospect, much as I would gladly do to forefend, I am convinced that there are other wars awaiting the arrival of their allotted time. We cannot see conclusive evidence that we have the wisdom to avoid war any more than our fathers and grandfathers. They desired war no more than we do.

What, then, is the part of wisdom? To me it seems beyond question that we should face the future with realistic minds and prepare ourselves for what is probably our unfortunate and inevitable lot. If we are to travel down the dark alley of the future with the philosophy and unpreparedness of a Caspar Milquetoast we know what will inevitably happen to us. If, on the other hand, we go with the preparedness of a Gene Tunney, we can be certain that any lurking enemies will be much more likely to let us go on our way without attack. All this was tersely expressed long ago by Theodore Roosevelt, "Speak softly, but carry a big stick."

May I conclude with a salutation to the men of the Officers' Reserve Corps. They are carrying on a high patriotic endeavor in giving unselfishly of their time and of their energy and their thought in order that this glorious country of ours may long be safe and secure. If all citizens would do their share as well as the Reserve officers are doing theirs, the evil day of the next war would be long postponed, and its successful outcome far more definitely assured.

International

Skis and Shadows Form a Lacework of Calisthenics by Italian Youth

Ordnance of the Confederacy, II

*Notes of Brig. Gen. Josiah Gorgas, Chief of Ordnance, C. S. A.**

BUREAU OF FOREIGN SUPPLIES: It soon became obvious that in the Ordnance Department we must rely greatly on the introduction of articles of prime necessity through the blockaded ports. As before stated, President Davis early saw this and had our officer detailed to go abroad as the agent of the Department. To systematize the introduction of the purchases, it was soon found advisable to own and run our own steamers. Major Huse made the suggestion also from that side of the water. Accordingly we purchased and sent in the ROBERT E. LEE at a cost of £30,000; a vessel capable of storing 650 bales of cotton. This vessel was kept running between Bermuda and Wilmington, and made some 15 to 18 successive trips before she was finally captured, the first 12 with the regularity of a packet. She was commanded at first by Captain Wilkinson of the Navy. Soon the ....., named the LADY DAVIS, was added and ran as successfully as the R. E. LEE. She had a capacity of about 450 bales and was, during the latter part of her career, commanded also by a former Navy Officer, Capt. R. H. Gayle. These vessels were long, low and rather narrow, built for swiftness and with their lights out, and with fuel that made little smoke they contrived to skip in and out of Wilmington at pleasure, in spite of a conclave of federal citizens, eager for the spoil of a blockade runner. Other vessels, the EUGENIA, a beautiful ship, the STAG and several others were added all devoted to bringing Ordnance supplies and finally general supplies. To supervise shipments at Bermuda, to which point they were brought by neutrals, either by steam or sail, Major Norman Walker was sent there by Mr. Sidney Randolph, about midsummer 1862. Later an army officer, Lt. Col. Smith Stansbury, was detached to take charge of the stores accumulated there. Depots were likewise made at Nassau and Havana. Thus much of the foreign organization.

But the organization of the business outside of our own soil was much the simplest part of the service. The home administration involved a variety of work so foreign to my other duties that I soon looked about for the proper person to discharge them in the most effective manner, by exclusive devotion to them; and I had Lieutenant Colonel Bayne detailed to my office for this duty. He had been wounded at Shiloh, and on his recovery joined me about September 1862.

It was soon found necessary in order that the vessels coming on through the blockade might have lading promptly on their arrival, that the Bureau should undertake the procuring and shipment of cotton to Wilmington by railroad; as well as to Charleston and other points, for we had vessels arriving at half a dozen ports from Wilmington to Galveston. This necessitated the establishment of a steam company at Wilmington, and affiliated with it, agents to procure the cotton in the interior, and see it to its destination; for the railroads were now so overtasked that it was only by placing positive orders from the Secretary of War in the hands of a selected agent that the cotton could be certainly forwarded over the various roads. The steam press was kept fully at work, in charge of Captain Seixas (Washington Artillery). The necessity for transportation over the railroads brought us in contact with them, and gave them claim on us for assistance in the matter of supplies, such as steel, iron, copper, &c; and especially for work at the various foundries and machine shops in which precedence was of course claimed for Army work, and which were therefore in great part controlled by the Ordnance Department. The foreign supplies were not all conveyed through steamers. There were contracts out for supplies through Texas from Mexico, and even from the United States; and there were blockade runners passing constantly through the lines in Northern Virginia, doubtless carrying contraband both ways. All this made a large body of work, which was confided wholly to the Bureau of Foreign Supplies.

Finding that the other departments of the Government would naturally claim a share in this avenue for supplies, which had been opened chiefly through my Bureau, it was detached at my instance, and attached to the Treasury Department remaining in charge of Colonel Bayne, with a good staff of officers and agents.

Thus the Ordnance Department consisted of a Bureau proper of Ordnance having its officers in the field, and at the Arsenals and Depots; of the Nitre and Mining Bureau and of the Bureau of Foreign supplies.

DEVELOPMENT OF THE ARSENALS, ARMORIES, AND OTHER PLACES OF MANUFACTURE OF ORDNANCE STORES: The Arsenals at Richmond soon grew into very large dimensions, and produced all the Ordnance stores that an army may require, except cannon and small arms, in quantities sufficient to supply the force in the field. I have by accident preserved a copy of the last number of the Richmond *Enquirer* published under the Confederate rule. It is dated April 1st, 1865, and contains the following "Statement of the principal issues from the Richmond Arsenal from July 1, 1861 to January 1, 1865": "341 Columbiade & siege guns (These were made at the Tredegar Works but issued from the Arsenal); 1306 field pieces, made chiefly at Tredegar works or captured; 1375 field gun carriages; 875 caissons; 152 forges; 6852 sets of Artillery harness; 921,441 rounds field, siege and sea coast ammunition; 1,456,190 friction primers; 1,110,966 fuzes; 17,423 portfires; 3985 rockets; 323,231 Infantry arms (most of these were turned in from the Army, from battle fields, and from the Richmond Armory); 34,067 Cavalry arms (same remark); 44,877 swords and sabres (from Army, battle field and contractors); 375,510 sets Infantry and Cavalry accts; 180,181 knapsacks; 478,498 haversacks; 328,977 canteens and straps; 115,087 gun and canteen slings; 72,413,854 small arm cartridges; 146,901,250 percussion caps; 69,418 Cavalry saddles; 85,139 Cavalry bridles; 75,611 Cavalry halters; 35,464 saddle blankets; 59,624 prs. spurs; 42,285 horse brushes; 56,903 curry combs."

This statement appears as an editorial, but the items were furnished from the office of the arsenal and may be relied on. Its Commandant at this time was Lieut. Col. LeRoy Brown, of Virginia, and he was assisted by Lt. James Donviddie. In the items of cavalry saddles, bridles, harness,

*This is the concluding part of General Gorgas' notes. Part I was published in the January-February issue of this Journal (Vol. XVI. No. 94).

infantry accoutrements, canteens and other articles of this character much assistance was received from the contractors. A small part of the percussion caps also came from other arsenals. When we reflect that the arsenal grew to these great dimensions in a little over two years it must be confessed that good use was made of the time. The laboratory attached to the arsenal was well conducted and did much work. It covered the island known as Green Island, which was connected with the shore by a bridge built by the Engineering Department especially for the service of this laboratory.

Besides the cap machinery which was a very large and improved plant, machinery for pressing balls, for driving time fuzes, for drawing friction primers and metallic cartridges, and other labor-saving machines were invented, made, and used with effect. In all respects the establishment, though extemporized, and lodged in a cluster of tobacco warehouses was equal to the first class arsenals of the United States in extent and facilities.

The arsenal at Augusta, Ga. was in great part organized in the City, where power and suitable buildings were obtained, and did much the same class of work done at Richmond, though on a much smaller scale. It was very serviceable to the armies serving in the South and West, and turned out a good deal of field artillery complete, the castings being excellent. Col. G. W. Rains, in charge of arsenal and powder works, found that the fusion of a small per cent of iron with the copper and tin improved the strength of the bronze castings very much.

The powder mills at Augusta, Ga. which I have already mentioned as the direct result of the order of President Davis, were wonderfully successful, and never met with serious accident; a safe indication of the goodness of its arrangements. It showed, too that under able direction the resources of southern workshops and the skill of its artizans had already become equal to the execution of great enterprises, involving high mechanical skill.

The arsenal and workshops at Charleston were also enlarged, steam introduced, and good work done in various departments. An abortive attempt was made here by General Ripley to cast a 15-inch Columbiad after the idea of the Rodman gun. Money was wanted and no result obtained. It required skillful and experienced direction, as in the case of the Augusta Powder Mills, to obtain these high results with our limited means.

The arsenal at Mt. Vernon, now furnished with steam power and having a good deal of machinery was considered out of position after the fall of New Orleans, and was moved to Selma, Ala., where it grew into a large well-ordered arsenal, of the first class, under the charge of Lieutenant Colonel White. It was relied on to a great extent for the equipment of the troops and fortifications in the southern part of the Confederacy.

Attracted by the deposits of pure iron ore immediately north of Selma, made accessible by the Selma, Rome and Dalton R.R., the War Department accepted the proposition of Mr. Collin McRae to undertake the erection at Selma of a large foundry for casting of cannon of the heaviest calibre. A large contract was made with him, and advance of money made from time to time as the work progressed. After a time Mr. McRae was called on by Mr. Davis to go abroad in connection with Confederate finances. He made it a condition that he should be relieved of his works and contract at Selma without pecuniary loss to himself. The works were thereupon assumed by the War and Navy Departments jointly and placed at first under the charge of Colonel Rainy as General Superintendent, while an officer of less rank took immediate charge. Subsequently it was agreed by the War Department that the Navy should take sole charge and use the works for their own purposes. It was here that Brooke made many of his formidable handled and rifled guns.

The foundry and rolling mills there grew into large proportions, supplied by the iron and coal of that region. Had the Confederacy survived, Selma bid fair to become the Pittsburgh of the South. The iron obtained from the brown hematite at the furnaces in Bibb County (Brierfield) and from Shelby works was admirable, the former being of unusual strength.

Mt. Vernon Arsenal was still continued, after being in a great measure dismantled, and was utilized to get lumber and timber for use elsewhere and to gather and prepare moss for making saddle blankets.

At *Montgomery,* shops were kept up for the repair of small arms and for the manufacture of articles of leather of which some supplies were obtained in that region.

There were many other small establishments and depots, some of them connected immediately with the Army as at Dublin, West Va.; Knoxville, Tenn., and Jackson, Miss. At the latter place an explosion took place which killed thirty, and left none alive who could tell positively the cause of it. Some shops at Lynchburg, Va. were moved to Danville near the south line of Virginia, and grew into a place of some value for repairs, etc.

The Ordnance shops at Nashville had been hurriedly transferred to Atlanta, Ga., on the fall of Fort Donelson; and when Atlanta was seriously threatened by the operations of Sherman, the arsenal there which had become very important was moved to Columbus, Ga. where there was the nucleus of our Ordnance establishment. Col. M. H. Wright soon made this now as valuable as Atlanta had been.

Armories and Small Arms: Besides the arsenals, a brief account of which has just been given, we had the armories at Richmond, and Fayetteville, N. C.; and arms were also made at other points.

The State of Virginia claimed all the machinery captured at Harper's Ferry, and was bringing it all to Richmond. It was agreed, however, with the State of North Carolina that that part of the machinery which was especially adapted to make the Miss. Rifle (Cal. 54) should go to Fayetteville, where there was an arsenal with good steam power: the machinery to be returned at the close of the war to the State of Virginia. Colonel Burton, an admirably educated machinist, superintended the re-erection of the works at Richmond. He was subsequently made Superintendent of Armories, and given full charge of the entire subject of manufacture of arms in the Confederacy. The machinery of the Rifle-Musket Cal. 58, retained at Richmond got to work as early as September 1861. If we had possessed the necessary number of workmen this "plant" could have been so filled in as to have easily produced 5000 stands per month working night and day. As it was I don't think we ever turned out more than 1500 in any one month. Fayetteville did not get to work until the spring of 1862, and did not average 400 per month for want of hands.

To supplement this scarcity of operatives Colonel Huse

was authorized to engage for us a number of skilled workmen, used to work on small arms, and to pay their passage over. They came in through the blockade at Wilmington without difficulty, but we could do nothing with them. They had been engaged to be paid in gold, which meantime had risen to such a price as to make their pay enormous, and would have produced utter disintegration among our own operatives. I offered to pay one-half of the wages promised them in gold, to their families in England, if they would take the other mostly in Confederate money which would support them here; and I brought the British Consul to confer with them. But they stood upon their bond; and forseeing that their presence would do more harm than good, I simply, with their consent, re-shipped them by the next steamer, and paid their passage and wages back. The experiment cost us something like £2000 gold, and made us shy of foreign workmen, especially English. I think the Treasury Department did succeed in getting engravers and printers, for their purposes at Columbia, S. C., to some extent by importation; but my impression is they were not English. Of all obstinate animals I have ever come in contact with, these English workmen were the most unreasonable.

The Cooke Bros. had, as heretofore stated, undertaken the making of rifle-muskets in N.O. at the very inception of the war. On the fall of New Orleans this machinery was hurriedly taken off by boats up the Mississippi. They finally selected Athens, Ga. as their point of manufacture and under a contract with me, and asserted with funds under that contract, proceeded to re-organize and extend their "plant". They were reasonably successful.

The want of Cavalry arms caused me to make a contract with parties in Richmond, to make the Sharp carbine, at that time the best cavalry arm we had. A set of machinery capable of turning out 100 arms a day was driven to completion in less than a year, all the machinery being built up "from the stump". The arm was never perfect, chiefly for want of nice workmanship about the "cut-off". It was not gas tight. We soon bought out the establishment, and converted it into a manufactory of rifle-carbines, cal. 58, as the best arm our skill would enable us to supply to the cavalry.

Recognizing the necessity of some great central establishment for the production of small arms, plans of buildings and estimates of machinery were made for such a one to be built at Macon, Ga.—a point of easy access and near to a fertile corn region, out of the way of the enemy. Colonel Burton went to England and easily negotiated for the machinery, which was to have been of sufficient capacity to turn out about 10,000 arms per month. Buildings were immediately obtained for some machinery for pistols which were transferred there; and Colonel Burton had made good progress in erecting ample buildings for the new machinery, part of which had arrived at Bermuda and Nassau, when the Confederacy fell. But about six months before the close of the war, finding that the blockade had become so stringent that the introduction of machinery would be very difficult; and reflecting too that as long as the war continued, this extended machinery would be of little use to us for want of workmen, I got the authority of the Secretary of War to set it up at some point abroad and bring in the arms, which would be less difficult than to bring in the machinery and create the workmen. Colonel Burton was abroad on this duty when the war closed. Had the war been prolonged, we should in twelve months have been making our own arms in a foreign land, under the sanction of a private name. After the war it was proposed to transfer the entire plant to the buildings which were in course of construction for it at Macon. Peace would then have found us in possession of a great army, which I much desired.

One of the earliest difficulties forced upon us in the manufacture of arms was to find an iron fit for the barrels. The "Skelps" found at Harper's Ferry served for a while, and when these were exhausted Colonel Burton selected an iron produced at .....Forge in Patrick Co., Va.; and by placing a skilled workman over the rolling process at the Tredegar Works he soon produced "skelps" with which he was satisfied. We found that almost any of the good brown hematite ores produced an iron of ample strength for the purpose; and the even grain and toughness could be attained by careful rerolling.

Besides the large armories at Richmond and Fayetteville smaller establishments grew up at Asheville, N. C. and at Tallassee, Ala. The former was the development of a private enterprise undertaken to repair and fit up old arms by a citizen (Mr. Pullen) resident there; and afterward as a matter of necessity assumed by the Confederate Government. Most of the machinery was moved before the close of the war to Columbia, S. C. whither as a place of safety, other arms-manufacturing machinery was moved from other points. Tallassee was selected as a good manufacturing point, a large building having been offered to us by the proprietors of the cotton mills there, and some machinery for making pistols moved thither from Columbus, Ga.

A GREAT part of the work of our Armories consisted in repairing arms brought in from the battle fields, or sent in from the armies in too damaged a condition to be efficiently repaired at the arsenals. In this way only could we utilize all the gleanings of the battle fields. My recollection is that we saved nearly 10,000 stands of arms from the field of Bull Run; and that the battle fields about Richmond in 1862, thus gave in about 25,000 excellent arms, through the labors of the armory at Richmond.

The original stock of arms it will be remembered consisted almost wholly of smooth-bore muskets, altered from flint to percussion using ounce balls, (cal. 69). There were some 15,000 to 20,000 Miss. Rifles; and then some irregular arms like Hall's rifles and carbines, some short carbines smooth-bore; and there were even some of the old flint-lock muskets. All this original stock disappeared almost wholly from our armies in the first two years of the war, and were replaced by a better class of arms, rifled and percussioned. It is pretty safe to assume that we had altogether, east and west of the Mississippi, 300,000 Infantry, pretty well armed by the middle of 1863. We must therefore have procured at least that number for our troops. But we must also have supplied the inevitable waste of two years of actual warfare. Placing the good arms thus lost at the moderate estimate of 100,000, we must have received from various sources 400,000 stands of Infantry arms in the two years of fighting, July 1, 1863. I can only estimate from memory the several sources from which this supply was derived, as follows:

Good rifled arms on hand at the beginning of the war (this includes the arms in the hands of volunteer companies)	25,000
New Arms manufactured in the Confederacy at the armories and in private establishments	40,000
Arms received from the battle fields and put in good order (this includes the great number of arms picked up by the soldiers themselves)	150,000
Imported from Jan. 1, 1862 to July 1, 1863	185,000
Total	400,000

This estimate does not include pistols and sabres of which a small supply was imported.

To account for the very large number of muskets obtained from the enemy (rather an under- than over-estimate) it must be remembered that in some fights where our troops were not finally successful, they were so at first; and swept over the camps and position of the enemy. Whenever a Confederate soldier saw a weapon better than his own, he took it and left his inferior arm; and although he may have been finally driven back he kept his improved musket. So too on every field there were partial successes which in the early part of the war resulted in improved weapons; and although on another part of the field there may have been a reverse, the enemy had not the same advantage; the Confederate arms being generally inferior to those of their adversaries. The difference of arms was not so marked at a later day, except in Cavalry arms in which we were always at a disadvantage, the celebrated Spencer carbine being generally in the hands of the enemies' cavalry during the last two years of the war.

A Central Laboratory: The unavoidable variation in the ammunition made at the different arsenals, pointed out early in the war that there should be a general superintendent of all the laboratories, invested with authority to visit and supervise the manipulation and materials. To this end Lieutenant Colonel Mallet, a chemist and scientist of distinction, who had for some years been professor in the University of Alabama, was selected and placed in charge of this delicate and important duty. I attribute much of the improvement in our ammunition to this happy selection. A more earnest or capable officer I cannot imagine. What a set of men we would have had after the war out of which to form an Ordnance Department had we been successful: Rains, St. John, Mallet, Benton, Wright, DeLagnel, White, Baldwin, Childs and others, who would have remained in the service. Then there were some no less admirable like Brown, Allen, Bayne, Cuyler, E. B. Smith, &c., who would doubtless have returned to their civil avocations.

Among the obvious necessities of a well regulated service was one large central laboratory, where all ammunition should be made; thus securing absolute uniformity, where uniformity was vital. The policy of dissemination so necessary to husband our transportation and to utilize the labor of non-combatants, must here yield to the greater necessity of obtaining an ammunition uniform in quality and in dimensions. Authority was therefore obtained from the War Department to concentrate this species of work at some central point. Macon, Ga. was selected and Colonel Mallet placed in charge of a Central Laboratory, as Burton was later placed in charge of a National Armory. Plans of the buildings and of the machinery required were submitted to the Secretary of War, and approved, and the work begun with energy. This pile of buildings had a facade of 600 feet, was designed with taste, and comprehended every possible appliance for good and well-organized work. The buildings were nearly ready for occupation at the close of the war and some of the machinery had arrived at Bermuda. In point of time this project preceded that of the National Armory, and was much nearer completion. These with our admirable powder mills at Augusta would have completed a set of works for the Ordnance Department, and in them we would have been in condition to supply arms and munitions to 300,000 men. To these would have been added a foundry for heavy guns at Selma or Brierfield, Ala. at which latter place the strongest cast iron in the country was produced, and when we had already purchased and were carrying on a furnace for the production of cold blast charcoal pig, for this special purpose. All these establishments were in the heart of the country, not readily reached by the enemy, and were in fact never reached by them until just at the close of the war. Being in or near excellent agricultural regions they would have had the advantage of cheap living for operatives; and they had all sufficient facilities for transportation, being situated on main lines of railroad.

Summary: I have thus from memory faintly traced the development of the means and resources by which our large armies were supplied with arms and ammunition. This involved manufacturing, mining and importation. The last two were confided in time to sub-Bureaus created *necessitate*, which were subsequently detached. The first was carried on by the armories, arsenals, laboratories and depots above noticed. We began in April 1861, without an arsenal, laboratory or powder mill of any capacity, and with no foundry or rolling mill except at Richmond; and before the close of 1863, in little over two years, we had built up, during all the harassments of war, *whilst holding our own in the field &c. defiantly and successfully*, against a powerful enemy, crippled by a depreciated currency, throttled with a blockade that deprived us of nearly all means of getting material or workmen, obliged to send almost every able bodied man to the field, unable to use the slave labor with which we were abundantly supplied, except in the most unskilled departments of production, hampered by want of transportation even of the commonest supplies of food, with no stock on hand even of the articles such as steel, copper, leather, even, which we must have to build up our establishments; against all these obstacles, in spite of all these deficiencies we persevered at home as determinedly as did our troops in the field against a more tangible opposition; and in a little over two years created, almost literally out of the ground, foundries and rolling mills (at Selma, Richmond, Atlanta and Macon); smelting works (at Petersburg); arsenical works (at Charlotte, N. C.); a powder mill far superior to any in the United States, and unsurpassed by any across the ocean; and a chain of arsenals, armories, and laboratories, equal in their capacity and their improved appointments, to the best of those in the United States; stretching link by link from Virginia to Alabama. Our people are justly proud of the valor and constancy of the troops which bore their banners bravely in the front of the enemy; but they will also reflect that these creations of skill and labor were the monuments which represented the patience, industry and perseverance of devoted and patriotic citizens; for of the success which attended the operations of any department of the Confederate Government the larger moiety was due to the coöperation of the body of the people; a coöperation founded in their hearty sympathy with, and their faith in, the cause which that Government represented.

Organization: The Ordnance Bureau as finally organized consisted of one Brigadier General, one Colonel and of such number of field officers, Captains and First Lieutenants as the service required. They were Artillery officers on Ordnance duty.

Appointments to these positions were at first made by

selection, or nomination by the Ordnance Bureau; but about October 2, 1862 Congress created 50 officers of Artillery, especially for Ordnance duty, to which 200 men were subsequently added. As selection for these officers involved much political contrivance I obtained the order of the Secretary of War to hold examinations for appointment to the grade of Captain and First Lieutenant. This plan succeeded entirely and relieved us from a thousand personal solicitations. The first examination was held in Richmond. Of some 500 applications found on file for Ordnance Officers less than 100 came to the examination, and of these only some 40 or 50 passed. The examination for Captain involved a fair knowledge of a college course of mathematics, and none I believe passed this except the A.M.s of the University of Virginia. That for first Lieutenant embraced only an ordinary English education, with a full examination on the Ordnance Manual. This gave us an excellent set of officers, educated men, and I am sure there never were in any army a better class of such officers.

These examinations were extended and were held at the headquarters of each army in the field by a commission of which Lt. Col. LeRoy Brown and Lt. Col. S. Stansbury were the chief members. These, or one of them, went to an army and associated with themselves one or more officers detailed by the General at headquarters. In order to provide for that class of valuable officers distinguished for excellent qualities developed by service in the field, but not prepared for a somewhat technical examination each General of an Army designated one or two of this class, who were appointed on his recommendation alone.

OFFICERS in the field were distributed as follows: to each army a "Chief Ordnance Officer," with the rank of Lt. Col.; to each Army Corps an Ordnance Officer with the rank of Major; to each division a Captain and to a Brigade a 1st Lieut.; all these attached to the staff of their respective Generals, but reporting also directly if necessary to the Ordnance Office through his superior in the field, and receiving instruction as to special duties, through the same channel. Every regiment had an Ordnance Sergeant, charged with the care of the Ordnance wagon, which contained the spare arms of the Armory of each regiment.

The officers in command of the greater Ordnance establishments, such as Richmond, Augusta, Atlanta, Macon, and Selma, had the grade of Lt. Col. like "Chief Ordnance Officers" of armies in the field; while at the lesser establishments the officers had rank according to the gravity of the duties devolving on them.

The Superintendent of Armories, Lieutenant Colonel Burton, and the Superintendent of Laboratories, Lieutenant Colonel Mallet, had also the grade of the higher officer in the field.

The labors and responsibilities of my department closed practically at Charlotte, N. C., on the 26th of April, when the President left that place with an escort for the trans. Miss. My last stated official duty that I can recall was to examine a cadet in the Confederate service for promotion to commissioned officer. On the afternoon of the 25th of April, I received due formal notice from the Adjt. Gen. Office that General Lawson, Quartermaster General, General Gilmer, Chief Engineer, and I were constituted a Board of Examiners on Cadet . . . . . We met a little before sundown in the ample upper story of a warehouse, in Charlotte, N. C. and by the waning light of the last day of the Confederate Government we went through all the stages of an examination of an expectant lieutenant of the Confederate Armies. Lawson, I think took him on Geography and History, Gilmer on the Mathematics, while I probably tested his English Grammar. He passed the ordeal in triumph and got his commission, which I dare say he prizes very highly, as he ought to do, considering the august body that signed the certificate which pronounced him qualified for it. Altogether there is no little incident of my Confederate career that I have mused over oftener than that twilight examination of the last Confederate Cadet.

DETACHED OBSERVATION. *Consumption of Small Arm Cartridges:* It appears that the Richmond Laboratory made 72,000,000 cartridges in 3½ years, say 1,000 working days. As the Laboratory made nearly as much as all the others combined we may safely place the entire production at 150,000,000 or 150,000 per day. As our reserves remained nearly the same, being but slightly increased toward the latter part of the war, there must have been only a little less than this consumption in the field, say ½ cartridge per man per day for the average force of 300,000 men, to cover all the accidents and expenditures of service in the field. An average then of ½ a cartridge per day per man would be a safe assumption for protracted warfare.

In examining the returns of Ordnance Officers after heavy actions, I found that the reduction of ammunition amounted to from about 19 to 26 rounds per man. At Gettysburg the reports of a few days before the battle, and a short time after, showed a difference of 25 or 26 rounds on the average. This was the heaviest consumption to which my attention was called. When our troops first took the field, commanders were very nervous because they had only 50 to 70 rounds per man instead of the 200 rounds presented by the Ordnance Manual. Later we raised it to about 80 or 90 rounds. The results of battle show that with proper disposition for transfer from one corps to another there need be no scarcity with 60 rounds on hand, or even fifty.

Our soldiers were, however, in the habit of supplying themselves with ammunition, by throwing away their empty cartridge boxes and taking any well supplied one that might be espied with the proper cartridges. What splendid fellows they were, taking even better care of their powder and lead than of themselves or of their rations. They were in downright earnest.

Consumption and supply of lead: Allowing for waste, 150 millions of cartridges would require 10,000,000 lbs. of lead for these alone, to say nothing of other needs. Where did all this lead come from? I make the following rough calculation:

From Trans. Miss. Mines (early in the war)	400,000 lbs.
From the mines in Va. (60,000 lbs. per month)	2,160,000 lbs.
On hand at Arsenals, &c	140,000 lbs.
Imported (not over)	2,000,000 lbs.
Picked up through the country and on battle fields	5,300,000 lbs.
	10,000,000 lbs.

This leads to the surprising conclusion that we must have picked up throughout the country over 5,300,000 lbs. of lead during the four years of the war. I remember that the window weights and loose lead about houses yielded 200,000 lbs. in Charleston alone; while the unused lead water pipes in Mobile, supplied if I am not mistaken as much more. These two items alone supplied 1/13th of this vast gleaning.

TRANSFER OF GUNS TO THE SOUTH: It was a charge often repeated against Governor Floyd that, as Secretary of War, he had with traitorous intent, abused his office by sending arms to the South, just before the secession of the states. The transactions which gave rise to the accusation were in the ordinary course of an economical administration of the War Department. After it had been determined to change the old flint-lock musket, which the United States preserved, to percussion, it was deemed cheaper to bring all the flint lock arms in store at Southern arsenals to the Northern arsenals and armories for alteration, rather than to send the necessary machinery and workmen to the South. Consequently the Southern arsenals were stripped of their deposits, which were sent to Springfield, ..., Pittsburgh, St. Louis, Frankford, Pa. and other points. After the conversion had been completed the denuded Southern Arsenals were again supplied with about the same numbers, perhaps slightly augmented, that had formerly been stored there. The quota deposited at the Charleston Arsenal where I was stationed in 1860, arrived there full a year before the opening of the war.

THE NAPOLEON FIELD GUN: I think I will be sustained by the Artillery in saying that on the whole this gun became the favorite for field service; perhaps because our rifle shells with percussion fuzes, were, as stated by General Alexander less successful than those of the enemy. When copper became scarce we fabricated an iron Napoleon with a wrought iron jacket, weighing in all 1250 lbs. which was entirely satisfactory; and was cheerfully accorded by the Artillery companionship with their bronze favorites. The simplicity and certainty of the ammunition of this smooth bore, its capacity for grape and canister, its good range, and its moderate draught as it was not too heavy for four horses, were certainly strong reasons in its favor. At the distances at which the serious work of the Artillery was done, it was an over-match for rifled artillery.

ARTILLERY AMMUNITION-BORMANN FUZE: Gen. E. P. Alexander does I think injustice to the efficiency of our Artillery, in his account of the Artillery of the Army in Northern Virginia. (If the ammunition had been as worthless as he described it our field artillery would never have dared to encounter that of the enemy. On the contrary I have often heard its daring spoken of in exalted terms and I never heard of any instance of backwardness on its part. To me it appears that the picture he draws of the uselessness of our ammunition would prove too much.) Since I saw Gen. A's account I have occasionally inquired of officers in reference to the general morale of the Artillery, and I cannot find that there was any want of enthusiasm in that arm. Now it would hardly be fair in any department to shelter its own defects behind a courage which nothing could daunt. Our men would have fought with wooden guns, and stones for projectiles, if they could have had nothing better. Still I cannot help thinking that no prolonged contest could have been sustained by any arm, against opponents equipped as ours were, had our ammunition been of the very inferior character attributed to it. My explanation of General Alexander's somewhat sweeping condemnation is that he had in his mind all the time the spherical case prepared with the Bormann fuze which deserved in a great degree all the adjectives he hurls at it. There was, however, no neglect on the part of the laboratorians engaged in its fabrication. I know that at Richmond, all was done that our skill could do to remedy its defects; and to stop the premature explosion of these shells. The image of our own brave men killed and wounded with ammunition prepared by ourselves was simply intolerable. Of course, I gave my personal attention to the matter, in the laboratory at Richmond, as did this able and experienced officer in the field; but whether from inferior workmanship in the gas-tight fitting of the fuze, or from defective castings in the spherical case—the thickness of which is less than that of the shell, and consequently needs better and stronger castings, or from both—we did not succeed; and I was only too glad to resume the use of the old paper colored fuzes, which were less scientific but to us more reliable. I can only give Gen. A. my sincere thanks for his tribute to me and to my department.

HEAVY GUNS: It was, of course, a matter of keen regret to me that we could not rapidly produce guns of heavy calibre for points, the defence of which against men of war, was of vital importance. But the 10-inch Columbiad could only be cast at the Tredegar Works, and although this establishment was in able hands and responded nobly to the calls made upon it, yet tasked as it was to produce artillery of all calibres, especially field artillery, we could but slowly answer the appeals made with equal vehemence from Pensacola, Yorktown, Charleston and New Orleans.

About the close of 1863 Major Huse sent in two Blakeley rifles of about 13-inch calibre, splendid looking, superbly mounted, and of fearful cost, £10,000 for the two in England, with 50 rounds each. Charleston claimed them upon their arrival at Wilmington and I was glad to strengthen General Beauregard's hands in any way our means permitted. Unfortunately one of them cracked in some trial firing with comparatively weak charges. The full charge, which was never reached, was 50 lbs. of powder and a solid rifle shell of say 450 lbs. The guns were built up of a wrought iron cylinder, closed at the breech with a brass screw plug some 30 inches long, and chambered to 7 inches. This cylinder had three successive jackets each shorter than its predecessor, so that from muzzle to breech the thickness of the gun increased by steps of about 3½ inches. The object of the 7-inch chamber in the brass plug was to afford an air or gas space which would diminish the strain on the gun. Such was the theory. General Ripley, however, cut down the big cartridge bags of 10 or 11 inches diameter so as to introduce the charge into the brass chamber. This, not being over three inches thick, cracked and the crack, I believe, extended into the cylinder. I never saw the drawings of the gun until after the report of the accident. Captain Brooks, Chief of Ordnance of the Navy, with me then looked over the drawings, and evolved the design of the air chamber. After this the gun was fired, and with moderate elevations attained fair but not remarkable ranges, as I was advised. The cracked gun was skillfully repaired at Charleston, and restored to a reliable condition.

Just before the war closed the Tredegar works had cast its first 12-inch gun after the method of Rodman-cast on a hollow core with water kept flowing in and out of it to cool the casting from the inside. This method of cooling had been found to give a marked increase of strength; and greater hardness and consequent smoothness to the finished bore.

Some effective rifle-guns were made out of the long heavy 32 pounders, banded and rifled with 5 shallow grooves. The shell had to be somewhat short in order not to be too heavy.

The Italian Army

The Fascist Ideal of Arms and the State

By P. Gentizon*

BEFORE the Fascist règime came into power, the prestige of the Italian Army had sunk very low. The inertia of the preceding governments, paralyzing the whole system of military organisation, and the general atmosphere of the country, frankly hostile to every national movement, had destroyed its power; and the masses, deeply infected with Bolshevism, refused to accept the duty of national defense. Nationalism in all its forms was everywhere derided, and officers so jeered at and insulted in the streets that often they no longer dared to wear their uniforms. Many (like General Del Bono, lately commanding in Africa) resigned their commissions, and joined the first groups of Fascists which were then being founded. Everything representing constituted authority or national sentiment, and above all militarism, was vilified and attacked on all sides. Ex-combatants, those who had volunteered for military service during the World War, and even those who had supported Italian intervention on the side of the Allies, were all equally condemned and treated to every term of degradation and humiliation. At the same time a campaign was launched for the rehabilitation of war-deserters, which culminated in the complete immunity from all penalties accorded to them by Nitti's Government. The tide ran so strongly that a barrister, who had been wounded in the War, was killed in the course of a meeting of the Socialist Town Council at Bologna—and the virulently antipatriotic character of the whole Red movement, the insults which those who had defended the country suffered at its hands, the brutal crimes committed at the expense of so many connected with the Army, explain in a large measure the fact that a large proportion of the first Fascists were recruited from ex-officers, non-commissioned officers and those who had served in the ranks as well.

Furthermore, Fascism is totally and uncompromisingly opposed to the antimilitarist concept: every political and philosophical theory contrary to the military spirit is condemned by it as a danger to national greatness; and that is why, since 1922, Fascism has formed and moulded the youth of Italy in a spirit of military fervor almost religious in its intensity, and has always from the beginning glorified the virtues of a large, powerful and highly disciplined army.

THE philosophical thesis on which this policy is founded may be briefly defined as follows:—Eternal peace is a dream which can never be realized; life on earth must of necessity be a perpetual struggle, and war is a great human reality. There must be ceaseless preparation for the day of battle, and peace can never be more than a truce, a pause, during which everyone prepares for the coming conflict. Mussolini, examining this problem of armed conflict between nations, is quoted by the *Legionario* as having said, "Whether or no all things come to birth in war, as Heraclitus believed; if it be of Divine origin, as Proudhon declared twenty-five centuries later; or, according to Renan, the element to which humanity must look for the roots of its progress, there is one fact of which I am myself personally certain—that the War we have just witnessed, and in which I am proud to have served as a simple soldier in the ranks, will not be the last". "War and peace" (according to Signore Ricci, the head of the Balilla movement) "are two phases in the life of a people each equally essential to its grandeur and future development." Signore Giuriati, ex-secretary general of the Fascist party, makes his profession of the philosophy of history as follows:—"Peace is not justice, but simply the reign of triumphant violence: it is no more than the period of time, longer or shorter as circumstances dictate, which is necessary to prepare a new war". In the preface to a book ("The Heroic Patrols") written for young people, the Duce puts the question as follows:—"Is it not far preferable to be killed in an attack than to die of some disease?" These are representative examples of the kind of spiritual food on which Italian youth has been fed for the last twelve years.

In the article defining Fascism which Mussolini himself wrote for the Italian Encyclopedia, he categorically affirms his disbelief in either the utility or the possibility of perpetual peace; and further declares that any cessation of struggle is a proof of cowardice. "War brings all human energies to their highest tension, and marks with the stamp of nobility the peoples which have the courage to undertake it. Thus every political doctrine which is based upon the postulate of peace is quite foreign to Fascism, and so also are all international organizations (even though Fascism may make use of them upon certain occasions) for (as all history proves) they will dissolve and disappear as soon as the nations of the world are moved to action by any deep and elemental motive, whether it be inspired by sentiment, idealism, or some practical consideration. And Fascism carries its antipacifist spirit into the life of every individual—the proud motto of the young Legionary, "Me ne frego" (*I scorn it*) written on the bandage of his wound, is not only a proof of stoic philosophy, but the summary of a doctrine deeper even than a political creed—it expresses the education for battle, the acceptance of its risks, and defines the future of the life of New Italy. Fascism rejects any kind of universal embrace, and though ready to live as a member of the community of civilized peoples, will be on its guard always, judging the hidden motives of its neighbors and the development of their separate interests, nor ever allow itself to be deceived by changing and deceptive appearances."

Such theories have of course been warmly defended in all ages: Joseph de Maistre sang the praises of war, the school of energy; Von Moltke declared that perpetual peace was a dream, more, an evil dream; and Signore Marinetti, the leader of Italian Futurism, has defined war as "the only world-hygiene"—but it is important to appreciate that even though Mussolini talks of war in this fashion, that does not necessarily mean that he desires it. It is quite possible to lay down a program, and define the large lines of action for a Government without war for ten years, or even a generation—but it is impossible to conceive of the future of humanity without new conflicts, between races, continents, and even

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individual states. No century in the history of mankind has ever passed without war; and it is in this (surely indisputable) sense that the Duce's words must be understood.

But it is none the less true that from the international point of view all Fascist theory is founded upon imperialism. The Duce's article on Fascism in the Italian Encyclopedia (to which allusion has already been made) contains the following illuminating passage: "The Fascist State is a living will to power and to Empire. The Roman tradition is here an ideal of force; according to Fascist doctrine Empire is not only an expression with a certain particular territorial, military or economic meaning, it is a moral and a spiritual force. One can conceive of an Empire (or a nation) without thereby implying that it has conquered a single square yard of territory. In Fascist eyes Empire (or in other words, expansion) is a manifestation of vitality; and its opposite a mark of decadence. Nations which rise, and are born again from their own ashes, are of necessity imperialist; nations which are dying on the contrary tend to renounce their empire. Fascism is the sole doctrine capable of representing the state of mind of a people which, like Italy, is rising again after centuries of decadence and foreign servitude. But Empire requires discipline, coördination of effort, a sense of discipline and a spirit of sacrifice. And this explains many of the practical aspects of the règime, amongst others its severity against those who would oppose this spontaneous and vital movement of the Italian nation in the 20th century with the out-worn idealology of the 19th."

One might perhaps summarize Fascist doctrine on the subject of war and international policy thus:—The history of peoples as of individuals is a struggle for life; and in the soul of a nation, as in that of an individual, there is an innate instinct to carve its own way at the expense of its (as of his) neighbors. That is why imperialism is indissolubly linked with the eternal laws of life, and of the spirit; and so far from being blamed, it ought to be recognized, respected, and even in case of necessity stimulated.

THIS short summary of the official philosophy of war is essential, in order to understand the important part which the Army plays in the New Italy. One of the very first tasks undertaken by the Fascist règime was to insure that the whole nation should have adequate military training, and with this object a scheme was worked out which was at once put into operation, providing a series of institutions through which every Italian subject passes, from earliest youth to manhood.

The principle upon which this scheme reposes is that every citizen is by virtue of the fact also a soldier: so that Italians, from the age of eight to the age of fifty-five, who possess the necessary physical qualifications are under a legal obligation which compels them to join their appropriate military or semimilitary organization. From eight to eighteen, at school and through the Fascist organisations for boys ("Wolf-cubs", *"Balillas", "Avantguardistas",* etc.) every boy receives a moral and physical training for the military profession, and must submit to a strict code of military discipline. If at eighteen he wants to become an aviator, a telegrapher, or a sailor he joins the *"Faisceaux de Combat";* and in any case goes through a course of training preparatory to his actual military service which is obligatory; six months in the first year and four months in the second, including forty parades each of three hours. These courses of preparation for regular military training are carried out by the Fascist militia, and their program is drawn up by the Ministry of War. Until recently the courses were held on Sundays, but the Church opposed this arrangement on the ground that it interfered with the religious duties of Italian youth; and so the Government decreed the "Fascist Saturday". As may be imagined, there is here no question of a week-end on the English model, for rest and amusement; the "Fascist Saturday" is not a holiday for the Italians which they can employ as they see fit, but organized by the Fascist militia for courses of military training. Throughout the whole peninsula Saturday is the day specially consecrated to physical and semimilitary training, for one of the most important aspects of this instruction preparatory to military service is physical training, by means of exercises and games. Its more specialized and theoretical branches are courses in military discipline and arms drill, range-firing,* machine-gun practice, etc. Almost a million young men pass through these preparatory courses every year, and about 200,000 more join the *"Faisceaux de Combat"*, through which (as has already been explained) they receive more detailed and specialized instruction.

After having undergone this preparation, at the age of twenty-one, the young Italian joins the Army for his period of military service, and begins to put into practice what he has already learned. After he has served his time, until the age of thirty-two, the citizen-soldier must still parade and drill on Saturdays. This is known as the post-military period, which serves to keep the reservists in touch and to maintain their efficiency. Italian subjects who have done their military service are liable to mobilization up to the age of fifty-five.

To sum up, military training forms part of the curriculum of every school in the country, and is continued in one fashion or another up to the entry into the university, so that from earliest youth until manhood, in daily life as well as in school and university, every Italian citizen lives in an atmosphere of militarism.

One of the greatest of these innovations is the inclusion of military instruction in the program of all schools and universities, by virtue of a scheme which came into operation on the 1st February 1935, based on the traditions of military and civic education which made of Ancient Rome so great a governing and civilizing power. It has been designed to give Italians of the Fascist era a new mental formation, in contradiction with pacifist theory—which is held to be basely material and weakening. By means of an education designed to develop its subjects morally, intellectually and physically, it is hoped to train Italians as citizens, and also in the art and spirit of war.

A circular has been sent out to every scholastic authority by the Minister of Education in which the application of this program of military instruction is elaborated; great stress is laid on the necessity of eliminating all contrast or conflict between civil and military life, or civil and military institutions; and it is emphasized that military education, as a factor of the highest moral importance, should become an integral part of general education.

The program of military instruction, as laid down by General Grazioli (published in the *Gazette Officielle*) includes three phases, corresponding to primary, secondary and uni-

*It is worth noting that amongst other measures designed to give Italy a strong military organization, the State has appropriated to itself all firing-ranges belonging to private or local societies. The Ministry of War now undertakes their maintenance, and such musketry ranges are now being laid out by the Army in every Commune, on the Swiss model.

versity education. The object of the first (or primary) course is chiefly to provide the elements of instruction on military organization; it is designed to be as attractive as possible to the pupil by the use of pictures, films, etc., under the direction of one master, and it includes as well as the general organization of the different arms, elementary map-reading, and a short history of the war (1915-1918). The second course, lasting two years, is designed for the instruction of those who will eventually form the minor military cadres; organization is dealt with in greater detail, and emphasis laid on the rôle of the Army in the life of the nation as a whole. The boys who are thus taught in the secondary schools learn the military peculiarities of the land and sea frontiers of the Italian peninsula, and the rôle of each different arm in the defense of the country in time of war: they are inculcated with the military spirit, and discipline, order, comradeship and sacrifice are held up as essential virtues.

The third (university) course, which lasts two years, is much more specialized; being designed to form the classes from which the Army must draw its higher personnel. The previous courses have given detailed technical and administrative instruction, and the last aims rather at intellectual than material guidance: the program treats of "The spirit of war as a political and social phenomenon", "The preparation of the nation for war", and "The philosophical basis of war".

IT is important further to note that these courses of preliminary military instruction are obligatory; no pupil can receive a diploma or pass his examinations without a certificate to prove that he has followed them with profit. They are allotted twenty hours of the scholastic year, and the officers who give them have the same powers and privileges as any other professor. Under General Grazioli's scheme they are charged with the task of assuring that their instruction is in harmony with that of all other branches; and the inauguration of this highly complicated and detailed system took place with great solemnity on the 1st of February 1935, In the universities, the whole body of students and professors were present, and at Rome and Milan General Grazioli himself made the inaugural speech. The present year is considered as a trial, but for the secondary schools at all events it is felt that an important gap has been filled. Up till now the education of the average Italian was designed to give him a general intellectual equipment in all branches of knowledge, but everything touching the Army and its organization was omitted; and the void has now been filled without over-charging the scholastic program, since the instruction given is varied, interesting, and not difficult to follow.

It is important not to misunderstand the object of these new measures, they are in no way intended to make of Italy a militarist nation, like pre-war Prussia: on the contrary, they are designed to eliminate any kind of closed military caste, living as it were a life of its own inside the nation. Henceforth there will only be citizen-soldiers, who will be automatically incorporated in the Army proper at the age of twenty-one, but prepared from infancy for their military duties. The period of service with the colors is no longer the beginning, but rather the culminating point of military education. By means of this scheme the conscripts when they join are already trained, not only by the Fascist Militia but by the education they have received through these preparatory courses. Thus their officers no longer have to start from the very foundation, but can at once proceed to specialized instruction in the various branches of general military science.

Every effort has been made throughout the Italian peninsula to create an army which shall include the whole nation, with every citizen able to march in step and carry a rifle; and those who cannot or will not bear arms for their country are not considered as entitled to full citizenship. "Whether or no by their own fault", (according to a recent article in the *Giornale d'Italia*) "citizens who have not the right to put on a soldier's uniform are to be pitied in civil life, for they can never hope to reach the highest positions in the State". Such lines recall the speeches of a Roman Proconsul, and the ideal which inspires them is that tradition which formed of the little peasant community on the banks of the Tiber those legions which once ruled the world.

These military reforms are of the utmost importance; they represent years of study on the part of the Duce—indeed, when in 1933 he himself took over all the military portfolios in the Cabinet, (Army, Marine and Aviation) it would appear that his chief object in so doing was to put into action his scheme of national military education, which is founded upon that conception of patriotic discipline, blind obedience to the head of the State and physical and moral training peculiar to the Fascist theory. This scheme of military training draws its inspiration from the heroism and spirit of sacrifice shown in the World War—which Fascism alone after the Armistice preserved and honored.

The Duce has always shown great personal affection for the Army. Called up in 1915 he himself fought as a soldier during the War, and from the very first days of the Fascist revolution defended the honor, dignity and prestige of the military profession. There is therefore nothing surprising in the fact that, as soon as he came into power, he gave special attention to military problems, and has personally taken part in the yearly maneuvers* which are the culminating point of military training. He even takes part in the exercises of certain special contingents, and sometimes cuts short his morning's work in the Palazzo Venezia to visit the laboratories where the mechanization of the armed forces is being worked out, or review some unit in the vicinity whose armament or uniform has been recently improved. Furthermore, the Duce, as the Head of the State, is in direct control of the General Headquarters of the Army and the Supreme Council of National Defense, the meetings of which have an ever-growing importance—and thus after twelve years of supreme power it is no exaggeration to say that he is as fully conversant with the detail of Army reform as with the large measures of national defense. One can go ever further, and say that he himself has personally planned the main lines of all military reorganization, for one of his main objects from the beginning has been to bring Italy up to her maximum possible power of military efficiency, and make the Italian Army worthy in every way of the new règime he has inaugurated.

*It is here perhaps interesting to recall Mussolini's statement in 1934, when after having followed the maneuvers with the utmost energy, and interested himself in the operations down to their most minute details, he made a speech to the assembled officers, standing on a gun-carriage. He then pointed out that though no one in Europe was deliberately preparing for war, yet war might none the less break out at any moment, as was proved by the events which had then just taken place in Austria (the assassination of the Chancellor, Dollfuss). It is indisputable that the rapid measures taken by Italy at that critical moment prevented the very grave complications which might have ensued.

The Duce continued by emphasizing the necessity of being prepared for war any day: Italy, he said, was becoming a military nation—even a warlike one—that is to say a nation inspired by the spirit of obedience, sacrifice and loyalty, consequently the whole life of the country must be guided by military exigencies. War has been defined, he declared, as the final High Court of Justice between nations; and in spite of all international conferences and protocols combat, which has always been the characteristic of humanity, will remain so to the end. Military power is the determining factor in national history, and must always best represent the strength of a nation.

THE population of Italy is now about 45 million souls, therefore it is not surprising that each class (that is to say the number of young men liable to be called up each year for service) reaches 560,000. Up till now the whole class has never yet been called to the colors, but it is probable that in the near future this will be the case, and the result will of course mean a larger effective military force than in the past. At present the yearly contingent reaches 300,000, but this figure does not include 22,000 officers, and 23,000 non-commissioned officers; so that the full strength of the Italian Army in time of peace must be put at 350,000 men.*

On the basis of these figures the country can count upon eight million men between the ages of 21 and 55 who have undergone or are undergoing military training, and are liable to mobilization in time of war. It is interesting to note that the physical requirements for the infantry have recently been modified; up to April 1933 the maximum height was one meter 74, and the minimum one meter 54; but a new order was then made raising the minimum height to one meter 58 and abolishing any maximum figure; with the object of ensuring that this highly important arm of the service should not include anyone below the normal physical standard. From this it can be concluded that the average physical standard of the nation is rising, since the average height of men is always an indication of their level of nutrition and fitness.

The statutory length of service with the colors is 18 months, but many exceptions are made, three, six or even twelve months leave being granted according to family obligations. It is now considered that six months training is sufficient for each man, and six months more to attain maximum efficiency as to the unit—that is to say, for the conscript twelve months service. But a new recruiting system is being prepared aiming not only at the training of each class as a whole, but also at the reduction of the time of service. A trial has already been made of this method, thus the contingent of the 1914 class (the men born in 1914) destined for service in the mobile arms (cavalry, bersaglieri, cyclist, armored car and light artillery corps) have been arranged in four divisions, and called up in rotation quarterly—so that throughout the year each unit is complete, being composed as to three-quarters of fully trained men, and as to one quarter of recruits.

The Fascist règime has also done a great deal to raise the efficiency of the cadres; the number of non-commissioned officers has been greatly increased, largely by voluntary enlistment, and it is hoped that their numbers will soon be complete, since it is held that modern tactics require an increasing measure of autonomy in the organization of each small group of men, and the character of modern warfare causes the greatest proportion of wastage among subaltern officers. The Italian Army is thus dealing with a problem in connection with what used to be one of its weakest points; formerly it could count only 17,000 corporals and sergeants, but this number has now been raised to 23,000.

THE corps of commissioned officers has been thoroughly reorganized and reformed—one can go so far as to say that in ten years it has completely changed in character through the measures which have been undertaken. Officers now rise in rank by passing a competitive examination, so that they are obliged to work much harder and their general level of efficiency now far surpasses what it used to be.

*Account must also be taken of the various semimilitary bodies, such as the Royal Guard, the Treasury Guard, and the permanent militia; which number about 90,000 men altogether.

A new law relative to military promotion has been put into operation, aiming at the solution of a problem partly due to the World War, when great numbers of junior officers were hurriedly recruited and condemned in consequence to a very slow rate of promotion; and partly to the great difference between the various arms of a modern army. By these new regulations the rota of officers who may hope to command a regiment has been revised and reduced in number; the rota of officers on the reserve list consequently increased; and above all the higher ranks filled by younger men—a very necessary measure. Promotion is now faster, less distinction is made between the different arms of the service, and the very large number of junior officers reduced, both in size and importance. All this naturally implies a more rigorous selection than formerly; the requirements are certainly stricter, but they are based very justly upon considerations of war service, general intelligence, physical fitness, moral and professional character and service record; they are applied with humanity, and officers who do not reach the required standard for promotion can pass into the reserve, or complete their service in the semi-military youth organisations previously referred to. As soon as the new regulations came into operation it was clear that they were entirely satisfactory, more than half the officers placed on the reserve list or retired were so dealt with at their own request, all applications are received in strict rotation, according to available vacancies, and there can be no doubt that the new system is accepted by the whole corps of commissioned officers as just, and in full conformity with their position as the élite of the nation.

The change in temper of the military cadres is in every way most striking: it was expressed by the Duce when he spoke of "the enthusiasm of Italian officers in the study of all problems relative to their profession". At his express wish a club has been founded in Rome for the officers of all the armed forces, and its superb premises, (the Palazzo Barberini, in the very center of the town) indicate the prestige and importance with which it is intended to invest this new institution.

The Fascist régime has also undertaken the reform of the General Staff. In every country and every army it is a matter of the utmost importance that the high commands should go to the best men, and also that a high percentage of officers should have gone through the necessary staff training, so that there need be no sudden improvization in time of war. The reforms are based on a scheme whereby every officer who has passed successfully through the Staff College and done his term of regimental duty shall have some staff experience, and is designed to facilitate the work of corps commanders in time of peace, and form a reserve of competent staff officers in time of war. Lieutenant colonels and colonels who are considered exceptionally able are promoted to the permanent staff, and enjoy special privileges beyond those who have simply passed through the Staff College and done a term of service.

All these regulations are aimed at the formation of the largest possible number of officers who have undergone staff training, and are capable of forming divisional staffs at very short notice; with the result that the prestige of the staff in general is raised, since it is composed of the best and most highly qualified men destined for future high command.

The problem of improving military technique has been dealt with in great detail, and the Engineer Corps completely reorganized. The fire power of the infantry unit has been

increased and the regimental armament, which a few years ago consisted of 56 light machine guns, 36 heavy machine guns, and three pieces of field artillery (65/17) is now raised to 81 light machine guns, 36 heavy machine guns, 4 pieces of field artillery (65/17) and 27 field mortars. It is particularly important to notice the improvement in the heavy machine-gun (caliber 8) which is provided not only with explosive but also armor-piercing shell and can thus be counted upon as a redoubtable arm against attack by tanks and airplanes as well as an excellent support for infantry operations.

EVERY infantry division will also shortly be supplied with antiaircraft gun batteries (caliber 20 mm.) and antitank batteries (caliber 47 mm.) as well. The army has also been recently supplied with light tanks; each "mobile division" is equipped with them, and they are shortly to be supplied to the cavalry regiments also. Every army corps* will include a tank battalion, either to remain as a separate unit, or be divided among the different divisions. These new light tanks, instead of being equipped (as formerly) with one antiaircraft type gun only, will now have two machine guns, (caliber 8 mm.) and research has produced for the artillery several new types of medium caliber gun, which will be put into service as soon as possible: the new type caliber 75/18 as well as the antiaircraft gun caliber 75/46 are already being manufactured.

The nature of the terrain upon which an Italian war must necessarily be fought excludes the possibility of complete mechanization of the army. Modern theory inclines to a "war of movement" and the rapid transport of troops, which has led to the equipment of every arm with motor transport as far as is practicable. Tanks are not considered as an integral and essential arm, but simply as a method of supporting and reinforcing infantry attack—for infantry remains in the Italian Army the principal arm, and the researches undertaken in the light of World War experience have all been aimed at producing light and quick-moving tanks, capable of operating in mountainous country.

The chief measures which have been undertaken to mechanize the army are as follows:—Heavy artillery and light artillery (that is to say the artillery forming part of each army corps and each mobile division) is equipped with motor transport. Special lorries have been constructed capable of climbing even the worst Alpine roads; and a type of lorry has been designed for use on all terrain (known as the "Tous-Terrain"), a six-wheeled vehicle,† of which the four rear wheels are on the principle of independent chassis suspension. Motor bicycles, capable of carrying one or two men, have been found of great utility. The small *light mobile tank 33* is similar to the English Carden-Loyd model. The Tank Corps includes some few 8- and 10-ton vehicles, and tractors for both medium and heavy artillery. Heavy oil Diesel engines are used for the largest lorries, and motors running on coal gas are increasingly employed.

In fine, the Italian Army is proceeding to an ever more complete motorization of all arms; but it is worth remarking that in general the military authorities have not themselves attempted to draw up special designs, but relied upon private enterprise to undertake the necessary research and experiment, upon the main lines laid down. The general organization of all the motor services is in the hands of specialist officers attached to each army corps. In case of general mobilization, a plan has been drawn up for the motorization of the whole service; private and commercial vehicles will be commandeered, and with this object certain rebatements of taxation and premiums for maintenance have been instituted for civilian motor vehicles of special military value, thus avoiding the necessity of very costly reserves. The mobile divisions (new units in the tradition of the Bersaglieri and the Cavalry) are being motorized rapidly; and the whole task of motorization has been envisaged on much the same lines as that of the French Army.

BESIDES the regular army, there exists also in Italy a second military force recognized by the State—the Black Shirt voluntary militia. It came into being in order to combat Bolshevism, and has been retained and reinforced as a sort of revolutionary guard which later undertook certain State functions, chiefly with the object of maintaining discipline in the public services. Thus certain detachments form a militia in charge of the railways, ports, posts and telegraphs, roads, forests and frontier posts; and the Black Shirts have also recently undertaken the tasks of coastal and aërial defense. Certain battalions of this Fascist militia are attached to the various army corps, to undertake the most difficult and dangerous operations in time of war; and for the last few years they have regularly taken part in the annual maneuvers side by side with the regular troops. It must further be noted that it is the militia officers who undertake the obligatory pre-military instruction of youth throughout the country; and it can thus fairly be deduced that the importance and efficiency of the Black Shirts as a military force has been increasing in the last few years.

That being the case, it is not surprising that the army and the militia, naturally at first jealous one of the other, have ended if not by merging into one force at any rate by becoming intimately connected. The progress of Fascist ideals has increased their mutual sympathy, and a good instance of this friendly feeling between the two forces is the visit paid last year by the officers of a Genoese cavalry regiment to General Teruzzi, then Chief of the General Staff of the Militia and also General-Secretary of the Fascist Party. Further, on the anniversary of the victory of Vittorio-Venetio in 1934, it was the soldiers of the regular army and not the Black Shirts who mounted guard at the Fascist Revolutionary Exhibition. The Duce has undoubtedly decided not only to reinforce and strengthen the ties of sentiment between the army and the militia, but to link the two forces together from the miliary point of view. With this object a sort of liaison office has been created, under his own direct control, having at its head a general who thus as it were represents the Ministry of War in its relations with the militia.

The total force of that body, including all sudsidiary formations, now reaches 400,000 men; all volunteers, drawn from the young men of twenty-one and upwards who are members of the Fascist Party. The admission of new recruits takes place every year, on the 24th of May, the anniversary of Italy's declaration of war, and the ceremony is known as the Fascist Levée. The Black Shirt Legions parade, each new recruit receives the accolade from the Militia officer, and swears to obey the Duce's orders in all circumstances, to serve him and

*The Italian Army today includes 13 army corps, composed of two or three divisions, making a grand total of 31 divisions; three mobile divisions, including brigades of which four are known as Alpine Brigades. The total infantry force consists of 112 regiments, of varying numbers of battalions.

†Specification:—46 CV motor, to carry a load of 2,500 kilos on made roads and 2,000 on rough ground; maximum speed 46 kilometers per hour; maximum speed at maximum power 2.5 kilometers; capable of climbing a slope of 60 degrees; weight 3,800 kilos.

"if the need should arise, shed his blood in the cause of the Fascist revolution". The Militia cadres are the same as those of the other national armed forces: Manipulus corresponds to Lieutenant, Centurion to Captain, Senior to Commandant, Consul to Colonel, Consul-General to General. The officers are recruited from those who have served in the Regular Army, Navy and Air Force; but with the exception of certain special detachments (the Militia Guards who undertake the policing of the ports, railways, forests, frontier posts, etc.) the Black Shirts are not permanently on service and can thus from the military point of view be regarded as reservists.

IN time of peace the Black Shirt force is at the disposition of the Duce, and carries out whatever orders he may give. In time of war it is either incorporated into the Army proper, or retains its own special organization on service—as for example the five Divisions of the Black Shirts serving in East Africa. They are named by certain dates commemorating national or Fascist history: the Division of the 23rd of March (the date of the founding of the shock troops); the Division of the 28th October (the date of the March on Rome); the Division of the 21st April (the date of the foundation of Rome); the Division of the 3rd of January (commemorating an important speech delivered by Mussolini on that day); and the Division of the 1st February (the date of the founding of the Militia Force). These five Fascist Divisions first sent out to Africa equal in number the regular troops, five Divisions also; and the military organization of the Party has been put on the same footing as that of the Army,* thus following the precedents of the French Revolution and Soviet Russia, each of which created a private military force.

The departure of the Fascist troops on active service is part of a plan to make practical use of the Militia: until now its organization has never been put to the test save at home, and it might be said to have simply a civil and political function; but today it is clear that the government has decided to put the Militia on the same footing as the regular troops; and they will now be able to give practical proof of their courage, discipline and military spirit in this colonial expedition. Such a decision proves that, as regards the armed forces of the country, it is not intended to rely solely upon the grand old Piedmontese tradition, but to supplement it by the Militia force which, formed of volunteers and inspired with revolutionary ardor, has created modern Italy.

For let it not be forgotten that these Black Shirts on service in Africa are all volunteers: that fact is in itself an indication of the mentality of Young Italy. That is not however so surprising a phenomenon as might at first be thought—it has always been easy to recruit volunteers in Italy for any popular cause, and it must not be forgotten that numbers of Tuscans, Lombards and Ligurians fought in the Napoleonic Armies and acquitted themselves admirably in many battles, notably in Spain and Russia. Geribaldian volunteers fought for France in 1870 against the national invader, and during the last war many Italians enlisted and fought in the French Army on the Argonne. The flow of volunteers who joined up for service in the Italian East African colonies are the heirs of that ancient and noble tradition.

Under present conditions mobilization is now an affair of two parts; firstly the calling to the colors and putting on a war footing of the available troops; and secondly, the organization of the nation as a whole, so that the military machine may work at its highest potential of efficiency. This essential organization of the nation as one whole has been greatly improved in recent years and today, as soon as war is declared, the mobilization of the civil forces takes place concurrently with that of the Army. The Fascist Government has drawn up a whole series of regulations with the object of creating a solid and unshakable national front in case of danger—which regulations amount virtually to the mobilization of the whole country. All Italian citizens, without distinction of age or sex, including women and minors, are charged according to their capacity with the task of national defense; and in order to put these regulations into force a "Committee of Resistance" is to be formed in each commune to insure the maintenance of discipline and the provision of all that is necessary for national defense. These bodies are in effect a new juridical creation; their powers amount in effect to the mobilization of the whole population, which in time of war must now submit to special disciplinary measures, involving heavy penalties for noncompliance. Fascist war discipline is therefore far from being an empty phrase: on the contrary, its effect is to transform the whole country into a basecamp, all the energies of which are concentrated upon the same object, the prosecution of the war.

THESE rigorous and severe measures are justified not only by the necessity of maintaining strict internal discipline, so as to avoid all disorders; they are explained also by the economic situation of the Italian peninsula should it be involved in an armed conflict. Any war undertaken by the Fascist règime on such conditions must necessarily be of the most implacable and unyielding nature, for neither it nor the country as a whole could afford to allow itself to be embroiled in a long drawn out struggle. If the Duce undertakes a war, he will do so in the hope and expectation of victory in the shortest possible space of time. He will throw into the struggle the whole force of the nation—it will be a sudden attack, supported by the whole country.

The drawing up of the measures necessary to the maintenance of the national economy and national defense have been confided to a "National Research Council" and a "Supreme Council for National Defense". The agrarian policy of the new règime has now made Italy independent of all imports of wheat, rice and maize; the victory in what has been called "The Battle of Corn" represents an annual national saving of two milliards of lire; and researches have been undertaken with special reference to military requirements to deal with the problem of a "national carburant". A motor running on charcoal gas has already been invented, but it is doubtful whether it will ever be of great practical value; and though a carburant has been successfully extracted from lignite and asphalt rock, its cost makes it prohibitive for commercial use. In order to reduce Italy's dependence upon foreign imports even in peace time, a carburant composed of a mixture of benzine and alcohol has been introduced for combustion engines; and in general the measures which have been undertaken in the course of the last few years will enable Italy to enjoy some selfsufficiency as regards carburants in time of war, and this achievement is of the utmost importance in view of the motorization of the Army.

According to a communiqué of the Supreme Council of National Defense, it is stated that the national resources are sufficient to meet any eventuality; and it is emphatically

*It is important however to remark that these Fascist Divisions operating in East Africa are commanded by generals of the regular army.

denied that the poverty of the Italian peninsula in primary products is such as to interfere with Italy's full liberty of decision and action in the sphere of foreign policy. It would appear that in case of extreme necessity she could suffice unto herself, and in time of war might live on her own resources until the moment of final decision.

THE ideas which are generally accepted in Italy in the matter of the political position of the Army have been set down by General Visconti-Prasca* in his book, "The Decisive War". The head of the Government has declared this book to be "completely Fascist", and the Under-Secretary of State for War, General Baistrocchi has recommended all officers to read it, stating that "its matter is in full accord with the conception of the military authorities, both as regards technical questions, and also Fascist theory". The fundamental principle of General Visconti-Prasca's thesis is that the Army is a political instrument, that is to say a force to carry out the aims of national policy. The Army is to politics what the gold reserve is to finance, and every effort ought thus to be made to prepare and perfect an organization capable of bringing a predetermined policy to successful fruition. In other words, what is here intended is not separation between the armed forces and the policy of the Government, but rather an ever closer liaison between the two, so as to avoid the antagonisms and misunderstandings which have so frequently militated against success in the past.

Political aims, and the situation created by them, must determine all military policy, whether theoretical, tactical or organic: political considerations must *always* be the first object—and Italy thus desires to create in her Army not an institution apart, separate from the life of the nation, but on the contrary an integral organism the leaders of which shall be in close and permanent contact with the political situation. The officers of such a force must not become specialists, given over to a lifeless routine, but above all consciously citizens, who in their own domain work for one clearly defined political end. It is essential that there should be close comprehension and coöperation between the political and military leaders; every officer ought to be trained also as a diplomat, that is to say, he should be capable of judging a foreign situation and the effects it may have upon his own country. War can no longer be envisaged as a sort of "art for art's sake" now that the Army is composed not of mercenaries, as heretofore, but citizens; a number of new psychological elements arise which have to be taken into consideration, and for the essential union of military and civil life mere contact between the respective leaders is not enough, every junior officer if he wants to do his work really well must be aware of the political situation and the object of the policy he is himself helping to carry out. Thus military training involves a considerable knowledge of foreign affairs.

A program of study has therefore been drawn up in Italy for the training of officers, to include modern languages, economics, history, law, geography, and modern political theory; for it is intended that they shall possess that wide intellectual horizon which the power to compare and judge alone can give, so that they may be capable of forming a military body fitted to the political needs of the nation.

In order to implement these ideals, which derive from the fundamental conception of the citizen-soldier and the nation in arms, the Government is making every effort to unite the Army and the Fascist Militia by submitting them to the same national discipline; and strict orders have been given to the corps of officers by the Ministry of War to conform in every detail with Fascist theory. The Duce arranged last winter that courses should be given in all military training establishments (both for officers and non-commissioned officers) explaining the doctrine, the institutions, the practical and theoretical aims of the system founded by him. Again, always with the same end in view, a close liaison is maintained between the technical and administrative military services and the syndicalist system, which may be called the foundation of the Fascist règime; in the opinion of the Duce there must be close coöperation between the Army and the economic life of the nation. Conferences have already taken place between syndicalist delegates and military experts; and this is probably the first historical instance of not only masters but workers also collaborating with the Army in time of peace to decide upon the necessary measures of national defense.

These various innovations all go to prove that the Duce, as Minister of War, Marine and Aviation, is making every effort to develop and increase unity and collaboration between the various arms of the services, and also between the representatives of economic life and the armed forces; his object being to unite them all for the defense of the country, amalgamating as it were the Army with the nation—that is to say including every aspect of the national life in the Fascist system. "The Army and the nation", he once declared, "are inseparable, in history and also in daily life; more especially today, when there are many new problems to be dealt with and forces, hitherto nonexistent, to be taken into consideration". The Duce is working to achieve the complete interpenetration of the Army and Fascism, so that the military machine shall form an integral part of the national life, for complete fusion into one Fascist unity.

In many respects the Army is already "fascistized", and a series of recent regulations facilitate the acceptance of serving officers as members of the Fascist Party. Instructional courses on Fascism (as we have already seen) are given to the troops, and even their uniform is changing, in conformity with this metamorphosis of the Army. The new design, adopted last year, consists of a tunic with an open collar worn over a greenish-grey shirt with a black tie; and this practical equipment is very similar to the militia uniform, lessening very much the previous striking contrast between the soldier and the volunteer Fascist militiaman. It is another instance of the openly expressed intention to create an ever closer union between the two forces.

IT is not surprising that amid the seething mass of new ideas which are one of the most striking phenomena of the Fascist epoch, theories of war should also be hotly debated. There is great discussion as to whether it is better to attempt to maintain a very large body of troops, as in the last war, or rather concentrate upon the formation of a small but highly efficient mobile force, as far as possible mechanized.

Let it be noted that certain Italian military writers have recently attacked the conscription system, on the ground that it is responsible, by the size of the force it produces, for what they call "static war". It is urged that a smaller army, highly trained, provided with motor transport, more rapid in move-

*General Visconti-Prasca commanded the detachment of Italian troops in the Saar, during the recent Plebiscite.

ment, easier to maneuver and with a more combative spirit is preferable: the problem can be described as the choice between quality and quantity. The present Under-Secretary of State for War, General Baistrocchi, has published an official memorandum in which it is stated that the general current of opinion amongst governments and general staffs today is all towards a war of movement, and thus to the formation of suitable bodies of troops; but it is also emphasized that such tendencies, though in logical reaction against "static war", may be dangerous in that they lead to the adoption of hard and fast theories which are possibly unrealizable and may be totally mistaken. He here refers to those, like General Von Seekt, who envisage a war of movement only, and urge the creation of a small highly mechanized army, able to make an immediate and rapid incursion into enemy territory and obtain decisive results before its adversary can move. But when General Von Seekt thus wrote, Germany was tied by the military restrictions imposed by her victors; and the German Reich having now replaced its small professional force by a conscript Army, General Von Seekt is probably only too glad of the change, and has ceased any longer to propose or to advocate or to defend his theory of the superiority of a small force.

In conclusion, General Baistrocchi urges the utmost realism in the consideration of this question, and refuses to exclude the possibility of a "static war", which in circumstances beyond the control of the Italian peninsula might be inevitable. He makes it clear that in his opinion Italy ought to possess a force capable of taking the offensive in a campaign of either kind; and does not hide his own preference for the "big battalions" which (according to Napoleon) are always ultimately victorious—that is to say, an army with large resources, utilizing to the full Italy's greatest source of military strength, her manpower.

AFTER considering all the aspects of the question we have here been studying, we must conclude that Italy today possesses an Army of the first quality, which must carry great weight in the balance of international affairs. Never perhaps since Roman times has the Italian peninsula been so well prepared, both morally and materially, to meet any eventuality; Fascism has made of it a nation not only martial in spirit but well armed as well. The end in view has not of course been to create a spirit of aggression, dangerous to world peace, but to form a people whose will to power may be based upon reality—that is to say, military strength. That end has been achieved: Fascism has made of the Italian Army a force more highly trained and stronger than ever before. The material with which it has to work is of course excellent; the Italian is sober and enduring, his courage incontestable; and the Italian troops comported themselves brilliantly during the War. Marshal Pètain himself has categorically stated that the resistance on the Piave in 1917 was entirely due to the action of the Italian troops—not to those of any other nation. It is important to point out that this is a matter upon which Italian opinion is insistent; there is here no question of *amour-propre,* Fascist Italy is conscious of the undeniable fact that military capacity carries great weight in international relations, and is fully aware that Italy is being watched by her neighbors. National prestige is to a great extent dependent upon military reputation, and therefore Italy insists upon a just recognition of her achievements during the War, and protests vigorously against any misrepresentation in this matter.

We must finally insist once more upon the importance given by the Fascist Government to the moral factor. In military matters, it is considered, technical training can be accelerated in case of necessity without any important loss of efficiency; but the moral foundations upon which it must repose are essentially the product of methodical and unceasing effort over a long period of time. Nothing can here replace the time factor, and the problem of preparedness is therefore held to be fundamental. It is from this point of view that the military organization of Italy has been most greatly changed: the new generation is being trained in an absolutely novel moral code which glorifies and exalts the military virtues; civil and military duties, civil and military virtues are no longer held to be distinct and separate, but reciprocal and identical—the citizen is a soldier and the soldier a citizen. This new moral code has profoundly modified the whole life of the nation, and such a phenomenon cannot fail to have vast repercussions, for the Italian example will certainly be followed elsewhere.

Another very striking characteristic of the Italian Army is the continuity of its program, due to the stability of the Government. There are no abortive experiments, the general plan has been worked out as a whole and in the greatest detail, and no sphere of action neglected. Consequently the results already achieved in moral, physical and technical training are already considerable; and it is remarkable that the methods of instruction, schemes of motorization, etc., have all been designed not in imitation of other armies, but according to the exigencies of the peninsula, the probable terrain of action and the Italian temperament. The progress already attained in this great scheme of military reform is one of the most striking achievements of modern Italy: fashioned and formed by Fascism, the Italian Army is the strongest guarantee and the greatest hope for the future of the country.

ARMY ORDNANCE

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Month by Month

AT this writing the long-overdue final report of the Nye Munitions Committee has not yet made its appearance. Until it does judgment is suspended. A good guess might be in order but already too much of the so-called investigation has been devoted largely to guess work—more of it would only becloud the issues. We propose to discuss the findings of the Committee in detail in future issues of this Journal, examining them in the light of unbiased analysis and refuting once and for all the absurdities which characterized the long and expensive hearings. Meantime a word concerning the Army Ordnance Association is in order.

MUNITIONS INVESTIGATION

In July, 1934, months before the Committee began its public hearings, three investigators of the Committee came to the Association's headquarters in Washington. As all members are fully aware, the Association's record of the past seventeen years is an open book—its finances are and always have been as clean as the proverbial hound's tooth, its purposes are of the highest patriotic nature, its activities are—and ever have been—conducted on the highest plane. Both the organization and its officials personally have nothing to hide or to fear in any way, shape or form. After three weeks of diligent fine-tooth-combing, the representatives of the Committee took away copies of several hundred letters from the Association's files. Only such letters were taken as suited the whims of the Committee representatives and then only letters thought to be susceptible of some sort of misconstruction.

After the tactics of the Committee had been thoroughly discredited in the public hearings, after months of headlines smearing almost everyone from past Presidents of the United States, the late great ruler of Britain, representatives of industrial companies and financial organizations and, finally, the characterization of our late War President, Woodrow Wilson as one who "falsified the record", lo and behold the Army Ordnance Association was honored by being included in the distingished company of witnesses. At the "hearing" on February 12, 1936, the Association was represented by its Executive Secretary. The procedure consisted of the Committee chairman reading into the record, for three hours, some several dozen letters which had been taken from the files, none of which, by the slightest stretch of the imagination could mean very much to anybody. Gossips, of course, like to read the other fellow's letters but until now we had thought the practice was confined to the guests of third-rate rooming houses.

During the inquisition of the Association the Committee was represented only by its Chairman, Senator Gerald P. Nye, and his chief investigator, Stephen Raushenbush. Senator Bennett Champ Clark was in attendance for several minutes. Most of the chairs of Committee members were occupied by representatives of the press. There were many newspaper headlines for which personal correspondence is generally juicy meat. But there was not a word about money or profit for the very simple reason that these are not in the picture. Indeed the total amount of money the Committee spent on its utterly useless endeavor—more than $190,000—would finance the Association for nearly ten years!

Later on, in these pages, we will take up the Committee's findings at length. Meanwhile we wonder whether the conclusions of such an investigation are worthy of serious discussion. We are inclined to feel as William Gillette, the actor, did years ago. Writing in the *American Mercury* recently, Channing Pollock tells that when Gillette was a young man studying stenography he practiced every evening for four months by taking down every word that was said in the sitting room of his boarding-house. Years after, Gillette said that nothing anyone said in those four months made any difference to anybody!

WHILE at this writing the War Department Appropriation Bill for the coming fiscal year is in conference of the House and Senate Committees, it appears practicable to assume that about $600,000,000 will be allotted to the Army. As passed by the House of Representatives the bill carried a total appropriation of $545,226,318. After action had been completed by the Senate $66,000,000 had been added to the House figure. Despite charges made in some quarters that this is the largest peace-time military appropriation in history, recourse to the record will show that the appropriations for 1920 and 1921 were larger.

MILITARY DEFENSE, 1937

Of course the entire sum which critics like to refer to as our armament bill is nothing of the kind. First off, $226,662,985 of the appropriation as it now stands will be used for strictly non-military activities. River and harbor improvement, flood control, Panama Canal maintenance and operation, national cemeteries and other miscellaneous engineering expenses, all coming under the jurisdiction of the War Department but nevertheless distinctly non-military, are of course not a part of the armament bill.

It may be interesting further to analyze the present appropriation to see just how much of it is for *armament*. We make the point because all too frequently the pacifist critic quotes our total Army appropriation as our "arms bill", leading the unsuspecting citizen to conclude that more than

half a billion dollars is going into the pockets of the "unconscionable" arms makers. The truth of course is that less than a fifth is for equipment and a great deal of that is made in Government arsenals.

So it may be interesting to break down the military part of the appropriation just to see where it leads us in this regard. Due to the fact that the final figures are not available only approximations can be given. The major part of the military appropriation (approximately 45 percent) is for what we call in civilian parlance "salaries", in military terminology it is for "pay of the Army". Some 38 percent of this will be paid to active personnel including allowances for officers and men, finance clerks, etc.; about 7 percent is for retired pay.

The next largest apportionment is for the Quartermaster Corps—about 15 percent of the total military appropriation, which goes for food, clothing, shelter, equipage and transportation. Slightly under 10 percent of the total will be for the National Guard. Approximately 4 percent will be used for the Civilian Military Training Camps, Reserve Officers' Training Corps and the Organized Reserves.

Of the remainder, approximately 20 percent will go to the Air Corps, the Ordnance Department, the Signal Corps and other technical branches and will be used for the design, procurement and maintenance of military equipment. The appropriation contains at this stage a total authorization for the Air Corps of $59,397,714, an increase of $14,000,000 over the current appropriations for this purpose. Of this increase $3,000,000 will be required for maintenance and the remainder will be used for the procurement of new airplanes and their accessories. Under this allotment 500 new airplanes will be provided for the Regular Army, 50 for the National Guard and 15 for the Organized Reserves, a total of 565 ships. Of these, 421 will be needed to replace obsolete craft.

The Ordnance appropriation, which is about 4 percent of the total, is $16,332,173. A slightly larger sum will go to the Signal Corps and other technical branches for the procurement and maintenance of equipment. Thus approximately 20 percent of the total arms bill is strictly speaking for armament, and while all the allotments are larger than in former years they are required now to make up for deficiencies of former years and to augment those supplies which have become out of balance. In this category the Air Corps requirement is of grave concern. The strength of the Corps is 838 combat airplanes, a meager portion of the 2320 recommended year before last by the Baker Board. To meet this figure and to allow for obsolescence, 800 planes a year will be required for five years. By providing 565 planes in the current appropriation, the Committees are working toward a force of 2300 ships instead of 4000.

At least two comments are appropriate. The first is that the present appropriations are definite evidence of the awakened public mind to the state of our military defenses. After many years of holding off, world events must convince even the obstructionist that we are wise in setting our own house in order. The other observation seems to us even more vital; namely, that any sane provision for military preparedness must visualize a balanced program throughout. For example, recognition of the strategic importance of the Air Corps is a splendid achievement but the fact remains that an airplane without armament is only an airplane. Not until ordnance is put on it does the airplane become a weapon. As a former Assistant Secretary of War once said, all that an airplane without ordnance can do is "give the enemy a dirty look". With somewhere near our requirement in aircraft taken care of, it is important that we look to and balance the ordnance program to go with it. If there is anything out of balance, if there are not sufficient machine guns and ammunition, and above all if there is not a perfected program for supplying the Air Force with at least the normal requirement of bombs, then this very important defense arm will be considerably out of joint. We hope that energetic consideration is being given to this factor of our defense requirement. It will be bad enough in time of emergency if our Air Force cannot perform its appointed mission; dirty looks from our people generally upon such an unbalanced program will be sure to come. Our national defense has become all too familiar with such looks from certain of our people. The thing to fear, however, would be an unarmed Air Corps because a plane, while it may be the best technically engineered and tactically operated in the world, is a poor excuse for a weapon unless it has all the ordnance it needs to make it so. To our way of thinking this is the pressing problem which deserves very serious and immediate consideration and favorable action.

And while we are on the subject, a word of highest commendation should be recorded for the good sense of the preponderating majority of the House of Representatives and the Senate. They have been doing some silly things lately but they have not missed any tricks in taking care of the major current needs of the Army and Navy. For that there should be all praise. This Journal doffs its cap to any group which has the good sense to keep its police force in order when all the roads are filled with reckless drivers.

Ordnance Profits

Of all the outlandish proposals of the present and recent past the provision inserted in the current War Department Appropriation Bill, limiting profits on the peace-time manufacture of aircraft and ordnance for the Army to 10 percent, takes the cake. Fortunately the provision was discarded when the legislation was passed by the Senate and at this writing, the bill now being in conference, it is unknown whether the provision will remain in the legislation or not.

In such a proposal we have a sterling example of emotionalism instead of realism guiding our national defense viewpoint. Much has been said and written about excessive war profits and there was room for some of the complaints. Candid opinion has been trying to find a way—and we believe it has been found—for equalizing the burdens of war and for preventing excessive profit to anyone. But the present 10 percent profit limitation is not a war-time measure and is aimed at those private concerns upon whom our military defense service looks for the production of equipment in time of peace as well as in time of war. From the plain, common-sense viewpoint there is, of course, no more reason why the private producer of ordnance or aircraft for the Army in time of peace should be limited to 10 percent profit on any particular contract than there is that the manufacturer of toothpaste or beans for the Army should be so limited. If the rule is to be that suppliers of the thousands of articles for the Army are confined to a certain maximum profit, the regulation—to be just—should apply to every one of those articles and not to some particular class. Under it

the fellow who sells the Army a consignment of rubber boots should have auditors in his plant checking the costs of material, labor and the items of profit no less than the chap who may be producing a tank for the Ordnance Department or a pursuit plane for the Air Corps.

Pure logic, however, seems no longer to be desired on such questions. Hence a group, indeed a very small group, of highly specialized producers would be singled out for profit limitation on some hard and fast rule which ultimately would result in strangulation instead of resuscitation of industrial coöperation in our national defense. This is the serious factor in the whole proposal. The full brunt of it would be known only in another emergency when there would be no private producer familiar with military production because in time of peace he had been frightened away and, by necessity, compelled to stay away from it.

None of this means that the producer of ordnance or aircraft demands excessive profit even in time of peace. He is entitled to a fair return on his enterprise just as every other producer is so entitled. If his profit last year was 2 percent due to slack orders, unforseen production difficulties, rising labor and material markets, he is not to be condemned, all factors being equal, if he tries to equalize on present orders. Basic economic factors, the legal safeguards that surround usual procurement methods and especially the yardstick of Government ordnance production costs, will always govern. But certainly no hard and fast rule in this regard will accomplish anything other than retardation of our military security.

Some weeks ago the *New York Sun,* in an editorial entitled "No Time for Jokers", made this pertinent comment on the effect of the proposed policy upon the manufacturers of aircraft: "At first glance a 10 percent profit appears to be ample for an industry selling to the government. According to theory a manufacturer should be able to carry on his commercial business the year round and make room for casual government orders assuring him a 10 percent profit. Under normal business conditions providing continuous orders for standardized equipment month after month one might do very well with a 10 percent profit. But the production of aircraft for the air forces is not a normal business. It is not standardized. It is a highly specialized, scientific business. There is no mass production about it. One does not pull his commercial, run of the mill planes out of stock and ship them to the air forces when they want combat planes. They are different, vastly so. And commercial business has not yet reached the stage where it pays its own way in the plants year after year. A manufacturer may have good commercial business this year and find his competitors taking it away from him for several years to come.

"Air force orders are limited. Sometimes only ten or twelve planes of a certain type and model will be ordered, again twenty, rarely more than fifty. A hundred planes is just about the maximum. What then is a manufacturer to do when he knows that a small order under the best conditions will not allow him to break even? For example, the manufacturer of a great bomber, the best in the world during 1935, spent $750,000 on development before he completed the first machine. Then he received an order for thirteen. Any schoolboy can tell that a 10 percent profit on the thirteen machines could not possibly reimburse the manufacturer for his development work.

"Then, too, there must be constant development work throughout the life of a service contract, and this casts up overhead items which cannot possibly be written off in a production order limiting profits to 10 percent. Also, each new contract involves, as a general rule, a new machine, faster and generally more efficient than its predecessors. Some other manufacturer may get the next order for that type by designing a better machine. A builder may receive an order today, run it through his plant in three months or six, then wait for months, or even as long as two years, before receiving another order. Each air force order not only has to pay its own way; it must help defray the overhead during the period between orders.

"What is the manufacturer to use for money between service orders? The 10 percent profit on a small contract will not enable him to maintain in readiness his experienced design and engineering staff, his skilled personnel, his machinery and other plant equipment—all of which he must keep on hand if he is to produce again. It will not let him carry on the enthusiastic, scientific development which he must have on hand or be ready to supply when the services come shopping again."

The same goes for ordnance production of which there is so very, very little by private manufacturers in this country today. Those who really think this profit limitation is a joker may eventually wake up to find that they have sponsored not only an unreasonable bit of theory regarding aircraft and guns but a very effective way of guaranteeing that we will be able to get none of either when we need them.

IN this issue of ARMY ORDNANCE we present a discussion of the Italian Army by M. Gentizon, distinguished commentator of *Le Temps,* Paris. We hope to publish in future issues similar analyses of other European military establishments by the same author. The translations are by Miss Jane Soames, secretary to the well-known English historian, Mr. Hilaire Belloc.

FOREIGN ARMIES

It is entirely fitting that the student of national defense should be informed, with a high degree of accuracy, on military developments of the present day. Too frequently motives are imputed and erroneous conclusions are drawn from half-stated truths with the result that conclusions follow tangents rather than straight lines. Certainly the average newspaper commentator is not equipped mentally or emotionally to discuss all the implications of the foreign or domestic scene. M. Gentizon senses the philosophy of the corporative state in which the national defense has a definite relation to the political arm. Obviously we hold no leaning to one form of foreign government as against another. For us the traditional American form is our own time-tested one and has always met our own conditions and will continue to meet them. To close one's eyes to the factual condition of other countries particularly where the military is a cognate part is to impute policies and conclusions to another which may not or do not exist. Hence it is incumbent today that we know what plans and theories are moving peoples and the measures that are being adopted to effectuate them.

In presenting these articles we believe that a distinct service is being performed. This service will be of the highest order if it succeeds in giving a factual picture of conditions as they are, prescinding entirely from any conclusion as to whether one agrees with the plan.

Powerful America

An Editorial

WE have just finished reading "Powerful America—Our Place in a Rearming World", by Mr. Eugene J. Young. For more than thirty years the author has watched at very close range the day-to-day developments in national and world politics. Previous to, during and subsequent to the Russo-Japanese war he was telegraph editor of the *New York Times*. From 1913 to 1930 he was telegraph editor, war editor, news and foreign editor of the *New York World*. This period included the World War, the Peace Conference and the twelve years of subsequent effort for world reorganization. He has been the cable editor of the *New York Times* since 1931, including all that recent period which has witnessed the Japanese venture in Manchuria, the war in Ethiopia and other critical events. By his position, and fortified with keen analytic powers, Mr. Young comes forth as a commentator to assuage the loss of the late Frank Simonds. His book, published by Frederick A. Stokes Company, is worthy of close study by every student of the domestic and foreign scene. It is one of those plain, matter of fact analyses of which there are all too few in this day of sensationalism, propaganda and thinly disguised efforts to sell the United States short.

Mr. Young deals in the realities of international politics. And where are there greater realists than there are in this field? He divides all the countries of the world into two great classes: the "haves" and the "have-nots". France, Great Britain and America are the empire builders, the latter to a lesser degree than the other two. From this grows the entire relationship of the present whether for peace or for war. World peace, as between these groups, has always been spoken of with reservation. The application is to ourselves no less than to others. Realities—actions rather than words—have always governed. Whether the policy be a Monroe Doctrine, an Open Door or the Good Neighbor, the attitude of the effective statesman has always been and will always be realistic.

THE field of the international statesman is not the province of this Journal. But powerful America, regardless of her foreign policy and irrespective of whether it is built along the lines suggested by Mr. Young, is a topic to which we can well give some thought. Policy is, of course, an innate concern of every good citizen. We believe that most good citizens who are practical reason thus: Peace is the normal, sought-for, demanded state of being. War is the abnormal, undesired, unsought method of restoring peace. War is the enforcement of a national will by other than peaceful means whether those means be social, economic or armed. No sane person has ever wanted deliberately to disrupt peace but only the insane have held that the right is not more precious than peace. So the position of the realist always comes back to very simple terms, namely, that peace some time or another is worth defending and the only means of defense in the final analysis is the application of force. All this has an immeasurable application to a powerful America. And the application lies, regardless of the maneuvers on the chess board of international relations, in the extent of our military and naval power, their coördination and effectiveness whenever it may have to be asserted. Put another way, we must look to our defense services as the sanction and the only sanction by which our security in the final analysis is guaranteed.

NEVER before in the history of the United States in times of peace have our Army and Navy had the effective status they now have. The Navy, our first line of defense, is on the way to treaty strength and treaty strength means the size and condition which experts of the Washington Treaty declare necessary to achieve its mission. The new Naval Treaty of London between France, Great Britain and the United States is an excellent arrangement for discouraging naval competition.

Our Army is similarly in a state of peace-time effectiveness. Its strength, while far less than the 280,000 authorized by the National Defense Act, now stands at 165,000 regular enlisted men which, in expert military opinion, is required for its mission. As to civilian soldiers, the National Guard and the Reserve Officers' Corps are performing the peace-time functions of studying and training which go to make them a competent reserve of military strength. Thus as to manpower there is ground for serene and secure outlook.

But in munitions power the outlook is not so rosy. True, it is in an immeasurably better state than it has ever been in our history because munitions power is only another way of expressing industrial power. We have the industrial facilities, the brains and the brawn to produce everything our defense forces may need in any emergency. We lack certain essential raw materials but we have the power to produce as probably no other nation on the face of the globe can. Under the National Defense Act of 1920 plans have been made and are currently revised for the utilization of our industrial strength. The one big deficiency in all elements of our power, however and whenever the national will may see fit to exert that power, is the general ignorance of how to produce the weapons we may need when we need them quickly, efficiently and effectively.

WE know that it is political poppycock to talk about the great peace-time arms industry of the United States. There is no such thing. We do have great industrial strength engaged in the production of peace-time commodities, the facilities of which are available for the production of military equipment when, as and if needed. We found during the World War that despite our industrial strength anywhere from a year to eighteen months were required for the transition. This was the net result of our power then and it will be again despite all the planning for the mobilization of industry in time of war unless industry knows beforehand the job it will have to do and will not be compelled to waste priceless time in learning how to do it after war begins. For all our education, our people are abysmally ignorant of this real measure of our national strength. If they were educated in terms of national security they would see to it that American industry is also educated and equipped to do its part efficiently and effectively whenever it may be called upon to do so. Industry has the will and the desire without unfair profit but, whatever way we use our power in future, industry must never be held accountable for any lack in its own education in terms of national defense. In this respect America will not be powerful until her industry knows how.

Professional Notes

NEW STANDARD 75-MM. ARTILLERY WEAPON

THE principal artillery weapon in modern warfare is that assigned to the artillery of the Infantry Division. The consensus of opinion of the armies of the entire world is that this weapon should be a cannon having a bore in the neighborhood of 75-mm., or 3-in. In the United States Army during the World War this need was met chiefly by the use of the French 75-mm. gun—the famous *Soixante Quinze*. This was, and still is, one of the best guns of its type ever built. As originally developed and used throughout the World War, the carriage was horse-drawn and had wooden wheels with steel tires. At the speeds capable of attainment with a horse-drawn vehicle, wooden wheels were entirely satisfactory. But with the advent of modern automotive equipment it has become necessary to "high speed" the carriage by providing it with rubber-tired wheels. This stage of development was accomplished about two years ago, and today practically all 75-mm. guns in active service in the Regular Army and the National Guard in the United States have this type of wheel.

"High speeding" the carriages has given them great mobility. It is now practicable to move them from place to place as rapidly as they can be drawn by any means of transportation available, thus insuring their presence where needed in the shortest practicable time. This, however, is but a small part of the whole problem. "High-speeding" does not render the guns as effective as they must be made after they arrive and have been placed in position if they are to compete with the artillery available to a potential enemy. A further and much more difficult stage of development has been necessitated by the need for greater range, for the ability to fire effectively upon rapidly moving targets, such as are presented by present-day fast tanks, and to shift quickly from target to target. This need has required the development not only of a new under-carriage to permit greater movement of the gun both vertically and horizontally, but also the development of a type of sighting equipment entirely different from that used during the World War upon the French matériel. The French sight was not provided with a telescope and, of course, at the time of its development no thought was given to the problem of firing at rapidly moving targets at any time because such targets did not then exist. Post-war developments of all sorts of fighting matériel have been extremely rapid, and have rendered the methods of fire control used during the World War obsolete and ineffective.

The War Department has been engaged for several years in attempting to solve the problem outlined above. It has recently perfected, and has just adopted as its standard service 75-mm. artillery weapon, a new type which makes use of the French gun

COMPARISON BETWEEN THE ORIGINAL FRENCH 75-MM. CARRIAGES AS MODIFIED BY THE REPLACEMENT OF THE WOODEN WHEELS BY RUBBER-TIRED WHEELS (LOWER), AND THE SAME WEAPON UPON THE NEW UNDER-CARRIAGE (UPPER). In each case the gun is elevated to its upper limit, which is 45° for the new matériel, and 19° for the original French matériel.

and recuperator, but provides a new under-carriage and sighting equipment. This carriage permits the gun to be fired at elevations up to 45° in place of the 19° obtainable with the French carriage. In terms of range this means an increase from a little over 5 miles to over 7½ miles—an increase in range of approximately 50 per cent. It permits a change of direction of the gun through 85° without moving the carriage; that is to say, at its maximum range this new matériel can sweep through a distance of about 11 miles along the enemy's front as compared with a distance of less than one mile for the original French carriage—an increase of more than 1100 per cent in enemy's front covered.

With the new under-carriage there is provided sighting equipment of increased efficiency including a panoramic telescope and a quadrant for fire at fixed targets, and a newly developed telescope and mount which, in test, have been found very effective in firing at rapidly moving targets.

It is impossible, of course, to evaluate the importance of the new matériel to our fighting forces, in terms of the greater power it will give to our divisional artillery. Certainly it is a fair assumption that it will increase many times the effectiveness of a firing battery.

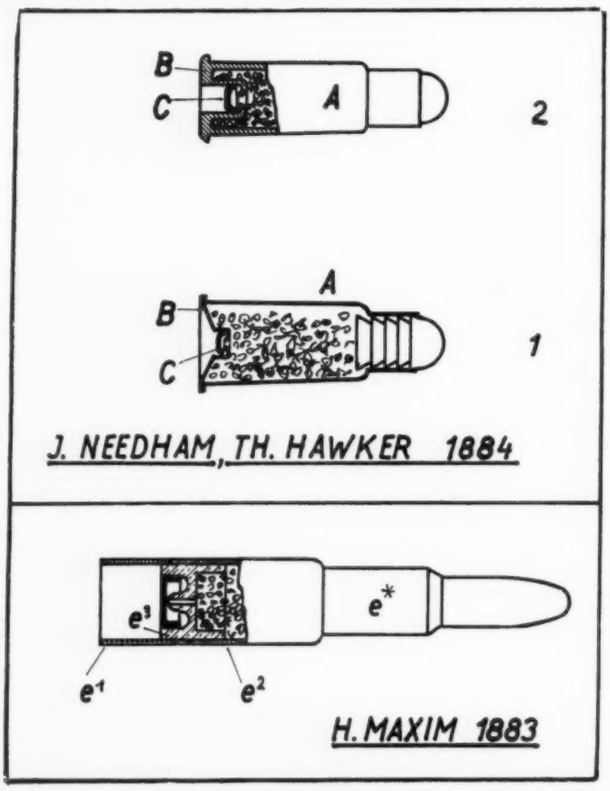
The life of a gun carriage, in service, is on the order of 80,000 rounds of ammunition. The cost of the new under-carriage and sighting equipment is less than that of 1,000 rounds. The sheer economy of the more efficient carriage is obvious.—*War Department Release.*

The Development of Primer-actuated Firearms

By H. Wimmersperg, Vienna.

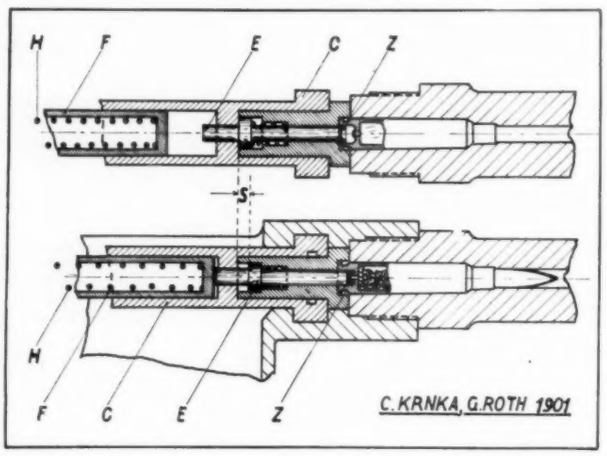
THERE are few technical fields in which more work has been done in the last fifty years than in that of firearms. Nevertheless, there is almost no field in which there have been fewer new ideas developed. Is there any other highly developed and complicated industrial article which has remained in use for more than forty years without becoming antiquated in performance and construction as is the case today with the repeating gun?

The United States Government conducted experiments for several years with a Garand semiautomatic rifle, which was actuated by the movement of the primer. As late as 1933 this principle was considered to be new! But the principle is fifty years old. Inasmuch as little is known about the principle, the following material will doubtless be of interest to those who construct or judge weapons, as well as to everyone who has anything at all to do with automatic guns.



On May 21, 1884, a gunmaker, Joseph Needham, and an engineer, Thomas H. S. Hawker, were granted English patent No. 7994, in which the following cartridge is protected: "The cartridge base is made concave; when ignited the concave is driven back and flattened on the face of the action, which forces back the striker or part of action, thereby resetting or actuating the latter; or instead of the concave, the cap or centre of the cartridge may be driven back."

"Fig. 1 of the accompanying drawing shows a longitudinal sec-



tion of our improved cartridge by which it will be seen that the base B of the shell A is concave or curved inwards, so that when the cartridge is exploded in the ordinary manner by the firing pin or hammers striking the cap C in the centre of the base, the force of the explosion will drive such base outwards, thereby forcing back the striking pin or hammer, the movement so obtained being utilized through any suitable mechanism for the purpose of resetting the firearm, and in the case of magazine firearms for reloading the same."

"Fig. 2 shows another form of our improved cartridge in which instead of making the base B concave, it is recessed in the centre, so that when exploded the cap will be forced outwards and act upon the striking pin or hammer as above described." The fundamental principle of the Garand semiautomatic rifle is here clearly and definitely expressed.

A YEAR earlier, Hiram Stevens Maxim was granted English patent No. 3497 which states: "The said improvements also consist in making the base of the cartridge case or shell cup-shaped as shown and fitting it tightly within the tubular portion of the shell, a short distance from the end thereof, in such a manner that by the force of the explosion the said base will be driven back to the end of the shell. In using these cartridges the end of the breech-block or plunger of the gun enters the rear part of the shell external to the base, so that the latter, when driven back by the force of the explosion, acts on the moving breech mechanism and imparts thereto the momentum by virtue of which it operates as above described, the tube of the shell or case being grasped by the extractor and drawn out as the breech-block or plunger moves backward."

". . . . . e indicates a metallic cartridge shell, the sides of which are parallel from e^1 to e^2, the remaining portion being taper. e^3 indicates the movable base, which, before the cartridge is fired, is in the position shewn, but which, during the explosion of the cartridge, moves to the end e^1 of the same."

Maxim therefore made use of the same fundamental ideas with a somewhat different construction. As a cartridge case which is

not cylindrical would burst when the gun is fired, if allowed to run back a short distance, even 1 to 2 mm., we find that in both patents the cartridge case itself is held fast during firing, and only the base or the primer moves within the cartridge case. Ten years later, in 1894, Georg Raschein built a self-loading gun in Malix, Switzerland, with a movable primer, but this had the great disadvantage that the primer had to be thrown entirely out, so that a separate opening was necessary for this purpose. Needham's and Maxim's solutions were therefore much more satisfactory.

In Austria, at about the turn of the century, Carl Krnka, in cooperation with G. Roth's cartridge factory in Vienna, produced, among many other models, a primer actuated semiautomatic rifle. We find it described, for example, in English patent No. 19839, of Oct. 4, 1901.

". . . . . the breech mechanism is operated by the backward movement of the percussion cap Z in a recess in the cartridge case. The firing-pin is made in two parts, E, F. The solid front part E of the firing-pin has a limited recoil movement in the breech-bolt C, to prevent the percussion cap from being blown out of the cartridge case. The hollow rear part F of the firing-pin is thrown back by the front part, compressing the combined recoil and firing spring H and unlocking and withdrawing the breech-bolt C."

"The breech mechanism and the magazine mechanism . . . . . form no part of the present invention as any other known mechanism could be substituted for the same."

We therefore find the firing mechanism divided into two parts here, the form which Gerand also used later.

This weapon operated excellently with ordinary powder, and was very convenient and handy. The Austrian technical military committee gave it the best recommendation of any experimental weapon. But the necessity of using special ammunition prevented its being adopted. Here, also, the operation of the weapon proved to depend upon a certain powder pressure curve. In accordance with European opinion and requirements, the gun had a rotary bolt, with symmetrical lugs, but this was not at all essential to the system. Krnka himself pointed out the possibility of using other types of breech mechanism. He also constructed an automatic pistol according to the same principle.

Krnka apparently believed at that time that he had found an absolutely new solution. This was not the case. Thirty years later, the same process was repeated. At that time, the idea was already 47 years old. But at least, one improvement had been made in construction. The use of special ammunition was obviated by reducing the movement of the primer.

NEW HOWITZERS FOR CAVALRY DIVISIONS

IN accordance with plans to equip all Regular Army and National Guard Cavalry divisions with 75-mm. field howitzers instead of their present French 75-mm. guns, a battery of the new 77-mm. howitzers developed by the Field Artillery and Ordnance Department has been turned over to the 82nd Field Artillery regiment (horse) attached to the First Cavalry Division at Fort Bliss, Tex., for extended service test. Additional batteries of the new howitzers are now under construction at Ordnance arsenals with delivery expected in the late spring or early summer. The 82nd Field Artillery will receive these, entirely replacing that outfit with howitzers instead of guns.

It has been found that the Field Artillery attached to the Cavalry divisions has been unable to keep up with the Cavalry. The lighter weight of the howitzers—about two-thirds the weight of the French 75s—and the fact that they have the new pneumatic tire carriage will eliminate this failing. The new howitzer has the firing characteristics of the pack howitzer combined with the advantages of the pneumatic tire carriage. It has a maximum range of something more than 9,000 yards. The lesser ranger, it is believed, will be more than offset by the greater mobility and greater flexibility of fire. This greater flexibility of fire is gained by means of the modern carriage. The new carriage provides a 45° elevation and a wide traverse which permits fire at a fast moving target and quick changes of target.

FIRST CAVALRY (MECHANIZED)

ON March 2, 1936, the First Cavalry (Mechanized) at Fort Knox, Kentucky celebrated the one hundred and third anniversary of its organization in a colorful formation at the post.

This, the oldest regiment of Cavalry in the service, first known as the United States Regiment of Dragoons, was formed pursuant to Act of Congress approved March 2, 1833 at Jefferson Barracks, Missouri, near St. Louis. When the Second Dragoons was authorized in 1836 its designation was changed to the First Regiment of Dragoons. The reason behind the formation of the regiment was this: as the western frontier moved steadily forward it came to the vast open prairies of the middle west. The Indians, mounted on horses, were able in their encounters with foot soldiers, to attack at will and retire safely or to escape punishment indefinitely by riding swiftly away. Finally, during the Black Hawk War, a battalion of Mounted Rangers was authorized. This battalion, although organized too late to serve in this war, demonstrated the value of cavalry and Congress passed the law calling for the Dragoons.

Up to the World War the First Cavalry had participated in all of the wars in which the country has been engaged since the regiment's inception in 1833. Prior to May 18, 1845 the regiment, first under the command of Col. Henry Dodge (after whom Ft. Dodge, Kansas is named) and Col. Stephen W. Kearny was stationed, frequently separated into detachments, in the Indian country of Missouri, Kansas, Arkansas and Texas. On that date Colonel Kearny led the regiment on a 2000 mile march made in less than 100 days to South Pass (West of Fort Laramie, Wyoming) and back to Fort Leavenworth, Kansas.

During the Mexican War the regiment was in every major force the United States had in the field, including Company F under Lieut. Phil Kearny which was singled out especially by Gen. Winfield Scott to become a part of his invading force at Vera Cruz. Colonel Kearny who had so long commanded the regiment was promoted in 1846, given command of the "Army of the West" which included a large part of his old regiment, and which occupied California, marching there by way of Santa Fe.

After the Mexican War more service in the Indian country fell to the regiment including active field service during the Rogue River War in Oregon in 1851, in New Mexico and Arizona against the Apaches, and with Colonel Wright's expeditions against Indians who had participated in the massacre of Colonel Steptoe's command in Washington Territory in 1858.

Prior to the war between the states the First Cavalry was transferred from the Pacific Coast to Washington, D. C. and during those troublous years it was present at Malvern Hill, Gettysburg, Brandy Station, Manassas Junction, and Spotsylvania Court House—to mention at random only a few of the numerous engagements.

After Appomatox and the "Great Review" in Washington in May 1865 the regiment once more went west via New Orleans and the Isthmus of Panama. Followed Crook's Oregon Campaign, Crooks Arizona Campaign, the Modoc War, the Nez Perce War in Idaho, the Infernal Caverns battle with the Pi-Utes in California, the Bannock War in Oregon, the Sheepeater Campaign of 1879, and finally the Sioux Campaign in Dakota of 1890-91. During this period of its history the First Cavalry engaged in literally hundreds of small engagements with the Indians where individual acts of heroism by officers and men took place to remain forever unsung.

In the Spanish American War the First Cavalry formed a part of Maj. Gen. Shafter's Corps in its expedition to Santiago de

Cuba where it participated in the principal engagements, such as Las Guasmas and San Juan. Then it sailed for the Philippines to help subdue the Insurrection of 1900-1902.

The World War found the regiment guarding the Mexican Border after the Villa Raid at Columbus, New Mexico, principally in the vicinity of Douglas, Arizona.

When the War Department determined that one regiment of Cavalry should be mounted in gasoline-propelled and armored mounts instead of on horses it was decided that the First Cavalry should also be first in this development, and so the regiment was moved from Marfa, Texas to Fort Knox in January, 1933 to take over the new work. Since then it has been hard at work trying to solve the many new technical and tactical problems presented by its new mounts.

The Regimental Standard of this famous old organization, as one would imagine, is loaded down with streamers called "Battle Honors" awarded for valorous participation in battles. A list of them follows: *Indian Wars:* New Mexico—1849, 1850, 1854, 1855, 1856; Washington—1858; Oregon—1866, 1867, 1868; Arizona—1868, 1869, 1870, 1881; Montana—1887 for engagements against the Modocs, Apaches, Nez Perces and Bannocks; Pine Ridge. *Spanish War:* Santiago. *Mexican War:* Buena Vista, Chihuahua—1848; California—1846; New Mexico—1846 and 1847; Coahulla—1846. *Civil War:* New Mexico—1862; Peninsula—1862; Antietam—1862; Chancellorsville—1862; Gettysburg—1862; Maryland—1863; Virginia—1863, 1864, 1865: Wilderness, Spotsylvania, Cold Harbor, Petersburg, Shenandoah, Appomattox. *Philippine Insurrection:* Luzon—1901.

The regiment has very lately been granted authority by the War Department to recruit to full peace strength and daily a string of likely young men may be seen at headquarters seeking enlistment. The authorities are a bit selective, as they may well be but there are still vacancies for well qualified young men. These recruits are rapidly becoming real soldiers

One of the distinguished soldiers of the regiment is Master Sergeant Lloyd M. Seibert who is the only enlisted man on active duty in the whole United States Army holding the Congressional Medal of Honor, earned during the World War at Epinonville in subduing a machine gun nest under extraordinary circumstances.

Among the famous officers who have from time to time served with the First Cavalry may be mentioned Jeff Davis who was adjutant at one time, resigning before the war between the states, Gen. John J. Pershing, Gen. Malin Craig, present Chief of Staff of the Army, and Maj. Gen. James G. Harbord, Chief of the Service of Supply during the World War.

The Sperry Mace: A Discussion of Exterior Ballistics

By C. H. Morgan

It is not proposed to compare the good sword Excalibur, or the powerful Battle-axe of Richard-the-Lion-Hearted with the recent development of the Sperry Mace. However, each may truly be considered as emblematic of its time. Thus, while the might of Excalibur caused righteousness and chivalry to prevail, and the Battle-axe of Richard is representative of the power and majesty of the age of feudalism, so the Sperry Mace may be classed as typical of the present scientific era (if golf as played by the author can be even remotely linked to the scientific).

The idea of applying the gyro to golf can be logically arrived at by pursuing both psychological and humanitarian principles. Psychologically the idea was reached by a deductive process of reasoning. A golf ball in flight is a true gyroscope, but the average golfer cannot make such a gyro behave. Some means must be employed to arrest its eccentric actions. Then, we reasoned, why not set a thief to catch a thief? And from this point it was a mere step to conclude that we should use a gyro to control a gyro.

To arrive at the idea on humanitarian grounds the synthetic process must be employed. During recent years the gyroscope has been successfully employed to stabilize the roll of ships, to provide true compass bearing and to navigate and control aircraft, surface craft and "unterseeboots". The gyro has been dedicated to promoting the comfort of and alleviating the danger to the masses enroute. But what has been done towards promoting the comfort of the long-suffering duffer and alleviating the dangers to his fellow club members? What has been done to overcome those Siamese twins of despair, the ever present slice and its companion in sin, the ultra-cursed hook? Absolutely nothing—until the development of the Sperry Mace. Since the advent of this new offensive weapon the old order of golf has changed. As truly as the invention of firearms placed all men on an equal basis; so the gyro, as embodied in the control of the Sperry driver, enables all golfers, thick or thin, long or short, duffer or pro, to meet on a common basis.

The basic principles of gyro control and their application to a driving arm are fundamentally simple. When a gyroscope is subjected to a couple, or force about an axis at right angles to its axis of rotation, it tends to resist that couple. In this manner, the gyroscope will exert resistance in the direction of the applied force and will precess in a direction at right angles thereto. In the chart (Fig. 1) there is portrayed the "projected line of

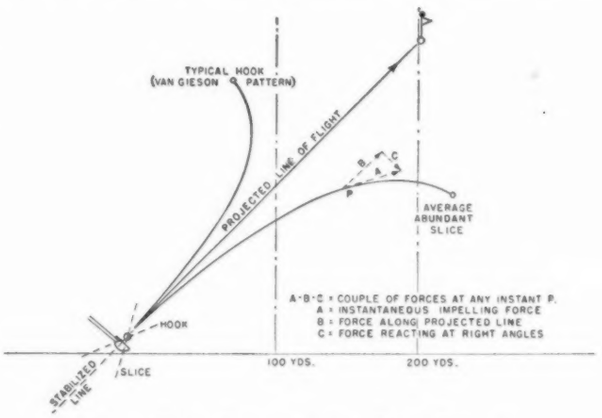


Fig. 1. Basic Principles of Gyro Control

flight" which the ever hopeful golfer seeks but invariably fails to attain. The actual results obtained are either the "average abundant slice" indicated, or, somewhat less frequent (author's experience), the pronounced and denounced hook, shown on the left of the projected course.

Referring again to the figure, it may be noted in the couple of forces A-B-C, that force "A" represents the instantaneous impelling force at a given instant along the curve of flight. Force "B" is exerted along the projected line and is therefore favorable; whereas force "C" operates to deflect the pellet and is the direct cause of the grievous results. From this analysis it is apparent that a gyro, properly mounted on the head of a driver so that it is free to precess in the direction of the line of flight, will resist the force "C" and prevent any divergence from the desired course.

All too frequently an ailment is recognized without the afflicted being aware of the specific means to effect a cure. It is common knowledge that a hook or slice results from the action of drawing the club head across the pellet so as to impart a transverse rotation or spin to the ball in flight. By restraining the club head to movement in the direction of the projected line of flight, the cross effect is abolished; hence no lateral spin or resulting hook or slice is imparted to the ball. Of course, a certain amount of vertical (top or back) spin remains which is exclusively in the desired line of flight and therefore helpful, as it assists the pellet to bore through the air and permits close control after comple-

tion of its flight. From this, the analogy to a projectile in flight is apparent. A bullet from a rifled gun is supplied with lateral spin (drift), while the top or back spin effects (tumbling) are strictly repressed. The opposite is true for golf, in which instance the gyro control represses the lateral motion and allows the top and back spin effects as desired.

A photograph of the controlled driver with the various components of the control unit is shown in Fig. 2. For purposes of illustration the components are shown disengaged. The power source, battery (1), is contained in the upper section of the

FIG. 2. THE GYRO-CONTROLLED DRIVER

driver shaft. The driving motor (2) is enclosed in the club head and is shown in an extended position. The vertical shaft of the armature engages with and drives the rotating axis of the gyroscope. The gyro is mounted on the club head as shown, the vertical axis being free to precess in the fore and aft direction of the desired line of flight.

When the driver shaft is lifted on the upswing, an inertia switch is closed which completes the circuit between the battery and the hyperinduction motor contained in the club head. The motor, specially constructed to provide maximum torque on 1.5 volt potential, rotates, when fully energized, at 6000 r.p.m. The pitch of the sound produced at this rotational velocity is characteristic, being readily identified by its close similarity to a Bronx cheer. This feature is of extreme importance in perfecting the timing of the swing. The club head is raised slowly on the back swing, the pitch of the motor rising in a *crescendo*, until a *fortissimo* is reached. This point marks the climax of the swing, and the down swing is then started. The motor being now fully activated, it controls the downward motion to the projected line of flight, and satisfactory results are insured.

The controlled driver proved its indubitable value in a series of golf matches during the past year between the capable representatives of the Ordnance Arsenals and a mediocre group of golfers from the Sperry Company. By a clever means of offsetting the gyro precession, it was found possible to produce an exorbitant slice and successfully bend around the woods maliciously guarding a green at Raritan Arsenal. Similarly an artificial hook was produced, which made it possible to skirt the woods and thus reach the deftly concealed positions of the greens on the course.

The most severe test was experienced on October 11, 1935 at Baltusrol, New Jersey on the occasion of the first annual competition for the "FRAPS" cup. This cup (Fig. 3), whose name was derived from the first letters of Frankford, Raritan, Army, Picatinny, and Sperry, was provided by mutual contribution and set up for annual competition by six-man teams from their respective establishments. The controlled driver did not falter in the face of heavy competition. When the sun set on that fateful day, friend and foe foregathered to proclaim and attest alike to the prowess of the Sperry Mace.

FIG. 3. THE "FRAPS" CUP

G. H. Q. AIR FORCE WINTER TEST AND MANEUVERS

WINTER tests and maneuvers by the G.H.Q. Air Force in New England during February, 1936, were conducted to determine the effectiveness of equipment and personnel in the severe cold weather conditions of the northeast. The maneuvers were conducted from February 1st to 15th under the command of Maj. Gen. Frank M. Andrews, G.H.Q. Air Force Commander. The airports at Burlington, Vt., Concord, N. H., and Mitchel Field, L. I., were selected as best meeting the climatic and tactical conditions of the winter test. This operation was decided upon at the conclusion of the recent Air Forces concentration in Florida (ARMY ORDNANCE, Vol. XVI, No. 94, p. 243) to ascertain the effects of winter weather on Air Corps personnel while using both standard and special winter equipment. The tactics of the maneuver were secondary to the test of equipment. During the test aircraft were constantly in the open without the facilities and protection of heated hangars. Engine heaters, sleeping bags, skiis, standard fuels and oils, electrical systems and bomb release mechanisms were among the items which underwent service test. Organizations which participated in the maneuver were the Eighth Pursuit Group Headquarters from Langley Field with 6 officers, 11 enlisted men, and 6 air-

MAJ. GEN. FRANK M. ANDREWS AND STAFF DURING THE WINTER MANEUVERS AT CONCORD, N. H.

planes; one bombardment squadron from the 2nd Bombardment Group, Langley Field, with 20 officers, 20 enlisted men, and 10 Martin bombers; one attack squadron from the 3rd Attack Group, Barksdale Field, with 20 officers, 20 enlisted men, and 20 Curtiss attack airplanes; one pursuit squadron from the 20th

Pursuit Group, Barksdale Field, with 20 officers and 20 Boeing airplanes; one service detachment each from Selfridge Field, Mitchel Field, and Langley Field, consisting of 9 officers, 90 enlisted men, and 6 cargo airplanes.

The equipment under test included several types of newly developed appliances. The Matériel Division of the Army Air Corps located at Wright Field, Dayton, Ohio, forwarded to New England for test several sets of field shelter equipment . Each set is composed of an individual weatherproof tent, an eiderdown sleeping bag, blankets and a pneumatic matress. The set is capable of being formed into a small roll and carried in the airplane, one for each member of the crew. When required these rolls are quickly unrolled and set up under the airplane wing, thus providing comfortable sleeping accommodations even in the most frigid weather.

ONE of the greatest problems of military aircraft personnel is flying in sub-zero temperatures. The provision of proper clothing for the combat crews so that they may perform their air missions has been given much attention. New types of helmets, gloves, boots, jackets and trousers were designed following the principles that the clothing must be light, warm and flexible. After considerable experimentation the decision was made to use lamb and sheep shearling which was specially treated and available in large quantities in the United States. All Air Corps personnel on these winter maneuvers wore this new clothing and were very enthusiastic about its comfort.

Winter Test Group, Concord, N. H.

The helmets, made from lamb shearling, are individually formed to the wearers' heads by a series of adjusting cords and the neck strap has been replaced by a chamois chin fastener. This latter eliminates the discomforts formerly caused by the chafing of the neck strap and the helmet fits the contour of the head more readily. Protection for the hands is afforded by large oversize mittens which are easily slipped on over silk or woolen gloves. The new type of boots are made from sheepskin and wool and comprise a water-proof wool-lined shoe which is worn over a slipper insert made from lamb shearling.

Winter operation in emergency seldom permits aircraft being stored in heated hangars and having other facilities which are ordinarily available in peace time. Various ideas have been tried out in the past for starting cold aircraft motors. These ideas among others have included the use of special priming fluids such as ether and the preheating of oil. It has been found that these schemes were not practical, especially when the engine has been outdoors for any length of time in temperatures far below zero. Preheated oil poured in such engines has solidified before a start could be made.

The scheme tested during the maneuvers uses a large gasoline heater in a small improvised tent which covers the water. Temperatures are built up around the engine by the fire pot sufficiently to start the motor easily. This system will undoubtably be adopted as a standard procedure subject to such refinements as are developed by further tests. In emergencies this procedure will resolve itself into a timed heating system whereby the aircraft can be started at any instant that orders are issued to take the air against an enemy.

Two airplanes equipped with a special starting system, which in past tests has made instantaneous starts without the necessity of heating, were tested. One plane is a Boeing P-26-A pursuit ship with an air-cooled engine, while the other is a Douglas

Machine Gunner in Cockpit of a Bomber

O-25-C observation plane with an experimental liquid-cooled engine. Instantaneous starts have been made at temperatures as low as thirty-three degrees F. below zero and there is every indication that these motors may be started at even much lower temperatures. With the development of this system, a take-off may be made safely within three minutes of the time the engine has been started.

An improved type of priming system was installed in all the airplanes taking part in the maneuvers which has greatly assisted cold starting. The priming in unusually cold weather is aided by use of butane, an extremely volatile liquid. In the event that take-offs must be made in deep snow, necessitating a higher power output than is obtained from the standard fuel, a limited quantity of 100 octane high test fuel has been provided to increase the safety factor of the engines.

An intricate system of communication including a radio network, telephone and telegraph, was used during the maneuver.

During the maneuvers in New England seven radio operators including two meteorologists were located at Concord. Mitchel Field and Burlington had three each.

Pursuit Warming Tent Tested During Maneuvers

In the opinion of the officers who participated in the winter maneuvers the G. H. Q. Air Force was able to determine some of the limitations weather may be expected to impose in the execution of a military mission and what steps will be necessary to overcome those limitations. In other words, the objective of this test conducted in sub-zero temperatures aloft and over ground covered with deep snow was to teach the Air Force how to do its job regardless of the weather—a serious objective indeed.

Ordnance Field Service

THE INFANTRY DIVISION ORDNANCE MAINTENANCE COMPANY, PART II

(Organization, Functions and Operations.)

By MAJ. RAYMOND MARSH, *Ord. Dept., U. S. Army*

SO far, I have said nothing about ammunition supply, first because I wish to devote an entire article in the near future to a discussion of the whole question of ammunition supply, and secondly, because of the unsatisfactory organization of our ammunition supply system, the contradictions which exist in the regulations, the division of responsibility and authority, and the uncertainty as to the future status of the ammunition supply service. I may briefly state here, however, that three solutions are possible. One would merely eliminate present contradictions in existing regulations; another would provide an adequate personnel in existing organizations for such ammunition supply functions as may be assigned to organizations after the present contradictions in regulations are corrected, and the third would completely reorganize the ammunition supply service, placing it completely under the control of the Ordnance Department and making the Ordnance Department responsible for everything connected with the supply of ammunition from the earliest phase of procurement down to and including initial issue and delivery to troops at distributing points. The last solution, in my own opinion, is by far the best and, in its united command, undivided control and centralized authority, it corresponds more closely to the ammunition supply service of both the French and the British.

THE organization of the medium maintenance company is shown on the attached chart. This Ordnance unit, like all other Ordnance companies, is organized primarily to provide the necessary specialists, tools, and supplies for the performance of particular missions. It is, in addition, a military unit. Consequently, there are in practically all Ordnance units, two organizations, one which we may call a technical organization for the proper employment of the technical means provided for the accomplishment of each of its several missions, and the other, a military organization which is necessary for the company's administration, discipline, and defensive employment. In the Ordnance maintenance company, there is little difference between these two organizations. The military organization of the company is comparable to that of a rifle company of Infantry. The technical organization, as can be seen, is along functional lines with the technical divisions headed Service Section, Artillery Section, Automotive Section and Armory Section. However, it must be remembered that detachments from the company may be made without reference to this technical subdivision or military organization, but governed by the primary consideration that the detachment may properly perform the mission for which it may be created. In other words, such detachments are an arbitrary grouping of the necessary technicians to carry out a particular mission.

For military purposes, the company is under the command of the Commanding Officer, Special Troops, and constitutes one of the units of the special troops organization of an Infantry Division. It is also a part of the division service trains and as such it is controlled in its operations and movements by the administrative orders, the preparation of which is one of the functions of the Division General Staff Officer known as the G-4. It is important to note that it may function only when these administrative orders release it from G-4 control.

ORDNANCE COMPANY, MEDIUM MAINTENANCE, INFANTRY DIVISION

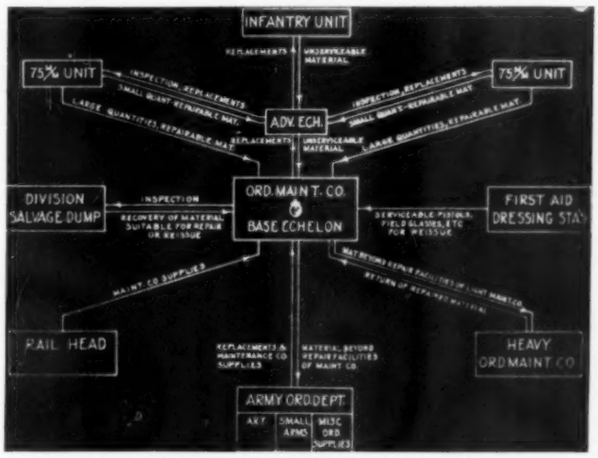
UNITS	HEADQUARTERS & SUPPLY SECTION	SERVICE SECTION	ARTILLERY SECTION	AUTOMOTIVE SECTION	ARMORY SECTION	TOTAL COMPANY	REMARKS
CAPTAIN	1					1	
FIRST LIEUTENANTS		1	1	1		3	
SECOND LIEUTENANTS			1	1	1	3	
TOTAL COMMISSIONED	1	1	2	2	1	7	
MASTER SERGEANT		1				1	
TECHNICAL SERGEANTS		1	1	1		3	
FIRST SERGEANT	1					1	
STAFF SERGEANT					1	1	
SERGEANTS	2	1	1	2	1	7	
CORPORALS	1	2				3	
PRIVATES FIRST CLASS & PRIVATES	10	20	26	45	21	122[A]	
TOTAL ENLISTED	14	25	28	48	23	138	
AGGREGATE	15	26	30	50	24	145	
CARS, LIGHT	2					2	
CAR, MOTOR, LIGHT	1					1	
KITCHEN, ROLLING, TRAILER	1					1	
TRACTOR, 5-TON			1			1	
TRAILER, 3-INCH FIELD GUN			1			1	
TRAILERS, WATER, FOUR-WHEEL	2[B]					2	
TRUCKS, CARGO, 3-TON, F W D	3					3	
TRUCK, TANK, GASOLINE	1					1	
TRUCKS, SMALL ARMS REPAIR					3	3	
TRUCKS, LIGHT MACHINE SHOP, M1		1	1	1		3	
TRUCKS, LIGHT REPAIR		1	1	1	1	4	
TRUCKS, SPARE PARTS		2	4	4	2	12	

COMPOSITE SECTIONS OF THIS COMPANY WILL BE DETACHED AS REQUIRED FOR ASSIGNMENT TO UNITS OPERATING SEPARATELY AND REQUIRING MAINTENANCE FACILITIES

[A] INCLUDES 40 PRIVATES FIRST CLASS

82 PRIVATES

[B] ONE FOR RESERVE WATER FOR VEHICLES

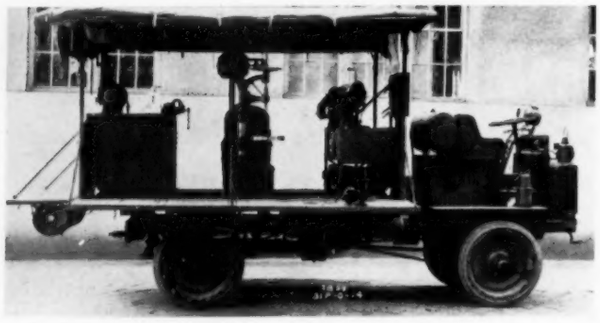


ORDNANCE MAINTENANCE COMPANY WITH INFANTRY DIVISION IN COMBAT

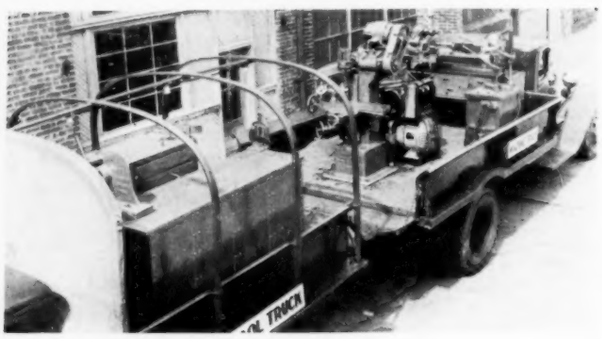
THE functions of the various sections of the Ordnance company are as follows:

(1) The headquarters and supply section includes personnel for military administration, such as the first sergeant, supply and mess sergeant, company clerk, cooks, etc. When the company is on the march it is responsible for the transportation for rations, baggage and passengers.

(2) The service section is composed of the occupational specialists who operate a machine shop truck for general work required by other sections of the company. It also handles the maintenance of the matériel assigned to the company, and carries the necessary spare tools and parts for the company's technical equipment. It performs machine-tool work, electrical work, welding, blacksmithing, etc., required, not only by the using arms, but also by other sections of the company. The master mechanic coördinates all repair work of the company. Necessary inspection and repair records are kept by him. The senior first lieutenant of the company is usually chief of the service section. He acts as company shop executive and supervises all repair and supply work performed by the company for whatever purpose.



Ordnance Repair Truck 1918 and



Today

(3) The armory section is charged with the inspection, and repair of infantry armament. For this purpose it has assigned appropriate trucks. On occasion, it may be advisable to advance beyond the company bivouac toward the combat troops, preferably to the vicinity of the small arms ammunition distributing point behind each infantry brigade, a detachment consisting of a repair truck and a spare parts truck. The light repair trucks act as liaison agents between the advance detachments and the company bivouac.

(4) The automotive section has charge of the inspection and repair of tanks and tractors, and such trucks and trailers as are issued by the Ordnance Department. In the repair of tanks, it supplements the work of the maintenance section of the tank company. Appropriate trucks are provided for this section for such work as it may perform at the Ordnance company bivouac, for roadside repairs, and for maintenance work at the bivouac or battle position of the using arm.

(5) The artillery section is charged with the inspection and repair of all artillery matériel with the division except vehicles handled by the automotive section. Like the automotive section, it is provided with the appropriate vehicles so that it may perform work at the Ordnance company bivouac. One or more spare parts trucks carrying artillery matériel spare parts may be advanced in a manner similar to that prescribed for the armory section.

So much for the general functions and organization of the Ordnance company. The next question is, how does this company operate? The movements of this company are covered in appropriate sections of the administrative order prepared, as I have indicated, by the Division G-4. The company usually marches with the motor elements of the division service train. However, its assignment to its place in column is contained in this administrative order; and likewise is the designation of its bivouac area, indicated ordinarily in accordance with the recommendations of the Division Ordnance Officer, after coördination by the G-4 with the needs of the other services. It is bivouacked, as far as practicable, in towns where shops or garages are available for its use. The bivouac should be located on the main route of evacuation of the division or on a side road leading thereto. It should always be on a good motor road. In the selection of this bivouac little or no consideration need be given to the locations of the other elements of the special troops. The bivouac should also be always located toward the rear of the division area, between the ammunition distributing points and the corps heavy maintenance company or army Ordnance installations. In the Command and General Staff School at Leavenworth, it is taught that the division Ordnance company should always be bivouacked on or near the main route between the ammunition distributing points and the ammunition refilling point, in order that empty ammunition carrying vehicles may be utilized to return unserviceable equipment for repair.

The company carries certain prescribed loads in its several vehicles, the details of which are given in standard nomenclature lists. When the company goes into bivouac, the trucks carrying the loads of spare parts are either unloaded or set up so that prompt issue can be made of the articles carried. Within the limit of the stocks carried by the company it may also be desirable to forward to the vicinity of ammunition distributing points replacement articles, spare parts and general supplies which may be required during combat by the troops calling at these distributing points.

When one is ill and calls a doctor, it is expected that the doctor will be possessed of greater ability than the family member who renders first aid, and also that he will be equipped with supplies and intruments in excess of the capacity of the family medicine chest. The same analogy holds good with respect to the abilities and equipment of an Ordnance maintenance company as compared with the Ordnance ability and equipment of a unit. Accordingly, when a unit calls upon the Ordnance maintenance company for service, it must be prepared to render service in excess of the ability of the unit to service itself. Consequently, we find the company equipped with tools which enable it to make more extensive repairs of matériel than the troops can make.

Calls for service from units may be met by sending to the unit making the call, a detachment of the necessary technicians together with the necessary tools and such spare parts as may be deemed necessary to meet the needs of the unit in distress. If the article can be repaired by that detachment at the place where it may be found, it should be so repaired with a minimum loss of time. The light repair trucks pertaining to the company are ordinarily used for transporting these small repair crews to the places where the unserviceable matériel may actually be located, has been collected, or may be brought. If it is impossible to repair the unserviceable item with the facilities and time available to these small detachments, then the unserviceable item is transported to the company bivouac and there repaired by the use of the additional shop facilities of the company equipment. If shop facilities or machine-tool equipment more elaborate or of greater capacity than available in the company are required for the proper repair of unserviceable items, and on the assumption that time is available for the repair, then, as I have indicated previously, this item may be taken to the corps heavy maintenance company, where with the larger and more elaborate machine-tool equipment of that organization, the item may be repaired.

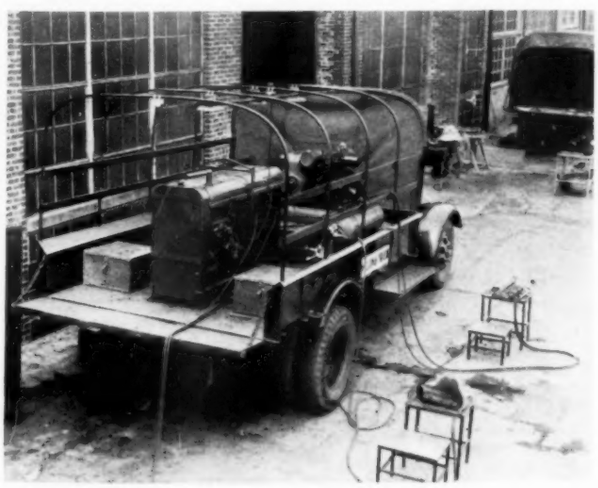
Composite detachments organized to serve particular units may be sent forward to ammunition distributing points during combat so as to be closer to the combat units when they need assistance. In sending forward these detachments or in sending out special detachments from the main bivouac of the company, the primary consideration is that all repairs possible within the limits of the personnel, facilities and time available should be made without removing the article from the hands of troops, not only to keep the item in service but also in order to keep shipments of replacement articles at a minimum. When it is impossible to effect the repair at the time and place where the item becomes unserviceable, a serviceable item should be issued, if possible then, from such stocks as may be available to the company.

The several detachments which may have been sent forward to the vicinity of ammunition distributing points may also be charged with the duty of salvaging all Ordnance equipment not required by the troops, or found abandoned, or found in an unserviceable condition. In furtherance of these salvage operations, collecting stations for the wounded, and collecting points for stragglers are visited by personnel from these detachments. After an advance takes place, the terrain is searched for Ordnance supplies. By thus obtaining matériel which can be placed in condition for re-issue, supplies are conserved and shipments to the division are minimized. Unserviceable items which are thus salvaged or items in excess of the company's requirements or ability to transport, must be evacuated. Arrangements for this evacuation are made by the company through the division Ordnance Officer unless there are general continuing instructions on the subject in force in the division. In some instances the company may have general authority to draw from and evacuate to corps Ordnance units, army Ordnance depots, or other army Ordnance installations.

Issues of supplies either by the company or by some of these above mentioned detachments is usually accomplished by the exchange of the unserviceable item for a serviceable item, or by some form of requisition. In an emergency, this requisition may merely be a receipt for the property issued. In any event, receipts are obtained for all issues made and receipts are given for all unserviceable property turned in by organizations.

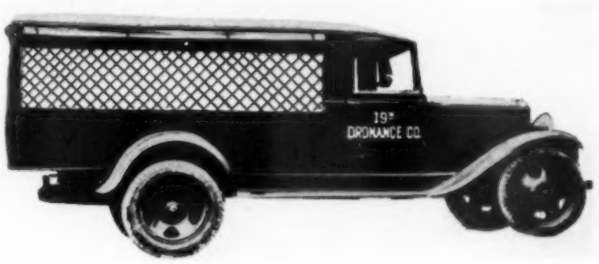
When an inspection of Ordnance matériel in the hands of troops is to be made it is necessary for the Division Ordnance Officer to organize inspecting parties from the Ordnance company personnel. These parties usually consist of an officer in charge, one or more enlisted men who are competent technical inspectors, and a recorder for each. The proper procedure, the general scope of the work done, and the nature of the report submitted by these detachments have been covered in earlier sections of this article.

Under existing provisions of the Staff Officers' Field Manual, the Division Ordnance Officer is responsible for the supply of small arms ammunition in the division. So long as this responsibility is imposed upon him—in contradiction to another provision which says that he is responsible for the supply of ammunition only as far forward as the refilling point—he must have some personnel for the supervision of the small arms ammunition distributing points and for contact with the reserve of small arms ammunition which is carried in the division Quartermaster train. It is considered highly essential that in a division maintenance company there should be at least three non-commissioned officers and three privates trained in those duties in connection with ammunition. For the efficient supervision of a small arms distributing point, one non-commissioned officer and one private



THE WELDING TRUCK

ORDNANCE LIGHT REPAIR TRUCK 1918 AND



TODAY

are considered the minimum. The reserve of small arms ammunition carried in the Quartermaster train is unloaded at the small arms ammunition distributing points in accordance with the approved ammunition plan. Then, by arrangement made by the Division Ordnance Officer, the Quartermaster transports such additional supplies of small arms ammunition as may be necessary to keep these distributing points in operation as long as they may be required.

I have covered, in an earlier part of this article the part which the Division Ordnance company may be called upon to play in connection with the issue of Ordnance supplies to units in the division. It may be necessary for personnel from the company to go to railheads to supervise issues of Ordnance items, or to have them accompany motor transportation to an army Ordnance depot to draw these supplies, and sometimes it may be possible to borrow these items from the larger stocks carried by the corps heavy maintenance company. Under any condition under existing regulations, the responsibility of the company personnel in connection with such issues extends to the time when the proper regimental supply officer or his representative accomplishes a receipt for all the property requisitioned and actually received.

THROUGHOUT this discussion of the functions, organization and operation of a division maintenance company, it must have been apparent that there are certain obligations imposed upon the company for which, under the present tables of organization, no provisions for necessary personnel, etc., are made. Also, in the discussion of the organization of the several technical sections of the company, it may have been observed that the descriptions did not entirely fit the table of organization shown. To meet these additional obligations imposed upon the company, the Ordnance Department is prepared to submit appropriate recommendations to the War Department. In any event, recommendations will be submitted asking for the creation, in the company, of a supply section whose primary function it will be to supervise or deliver issues of Ordnance matériel to organizations of the division, in accordance with the general principles which we discussed under the general subject of issue.

As I have indicated, the ammunition situation is most confusing and is the most difficult of proper solution. The Ordnance De-

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partment has recommended that the ammunition supply system be completely reorganized, imposing upon the Ordnance Department complete responsibility for the ammunition supply service from the earliest phase of procurement right on down to and including issues to the using troops. If this recommendation is approved, it will lead to the organization of Ordnance units charged with all functions pertaining to the transportation, issue, and delivery of ammunition as far forward as the distributing point. If this recommendation be not approved, and if the conflicts in existing regulations as to the duties of Ordnance personnel with respect to ammunition be eliminated, and if the Ordnance officer of a division continues to be charged with the responsibility for the supply of small arms ammunition alone, then there must be created in the division Ordnance company an additional section to be known as the ammunition section, which will be sufficient to provide the necessary supervisory personnel for the efficient and effective operation of the small arms ammunition distributing points. The Ordnance Department is prepared to submit such a recommendation.

In the internal organization of the company itself, and the assignment of vehicles to the company and to the several sections thereof, these are questions the solutions of which are within the province of the Ordnance Department itself. Primary studies of the internal organization of the Ordnance company indicate, first, the necessity of greatly increasing the number of light repair trucks in the company. This will be done so as to improve the employment by the Ordnance company of composite detachments sent out to service certain particular type units or to answer special calls for service. The consensus of opinion now indicates that spare parts trucks should not be assigned to the several technical sections, but should be asigned to the headquarters and supply section of the company, because of the fact that the primary purpose of the supply of spare parts transported by the company is to supply the needs of its own technical sections for these spare parts. The small arms repair truck apparently is a thing of the past. This truck was originally designed and equipped for the purpose of maintaining individual equipment which at that time included a great many items of web material. These web items are no longer items of Ordnance issue. Consequently, the need for the principal items of equipment on a small arms repair truck no longer exists. To maintain small arms themselves, it is considered entirely practicable and much more desirable to effect this maintenance service through the medium of light repair trucks supported by an adequate supply of spare parts and equipped with a minimum of tools, including but little more than vises and the hand tools required by an armorer.

It may appear that, throughout this discussion, "ifs", "ands", and "buts", have been used in great number. That criticism is probably well founded, but the redeeming feature is that the large number of conditional expressions indicates that the subject is being widely considered throughout the Ordnance Department, that the alternatives are fully realized, and that no matter what combinations may be finally effected, some possible solution is capable of application. I think it is therefore a very safe prediction that within a short time the Ordnance company for the Infantry Division will be organized, and equipped so it will be fully capable of meeting any and all of the responsibilities which may be imposed upon it.

Editor's Note: This series of articles by Major Marsh describing the supply and maintenance functions of the Ordnance Department of the Army have included thus far: "Organization and Operation of the Ordnance Department" (Vol. XV, No. 89, p. 303 and Vol. XV, No. 90, p. 365); "Ordnance Activities in the Zone of the Interior" (Vol. XVI, No. 91, p. 45 and Vol. XVI, No. 92, p. 116); "Ordnance Activities in the Theater of Operations" (Vol. XVI, No. 93, p. 180) and "The Infantry Division Ordnance Maintenance Company" (Vol. XVI, No. 94, p. 245 and in this issue). In the next issue the author will begin his discussion of the important subject, "Ammunition Supply".

Book Reviews

THE AMERICAN ARMY IN FRANCE. By Maj. Gen. James G. Harbord. Boston: Little, Brown and Company. 1936. $5.00.

IN the last paragraph of his book the author has written: "Let us hope that other generations of Americans, if there must be war, will have a Pershing of their day to lead their armies." The Chief of Staff of the American Expeditionary Forces is wishing his country the greatest of good fortune in expressing this hope, for he ranks his commander among the three best generals in the history of the Republic. There is much in General Pershing's achivements to support this view;—who has commanded a greater army?—who has displayed more administrative ability, more integrity, more dignity under such enormous burdens? Of course, few can find grounds for dispute on this point, a fact that Americans henceforth will acknowledge with pride. But General Pershing's opportunities to exhibit his talent for war were too limited to permit judgment of him as a fighting commander. It was his fate, and at the same time a happy issue for his nation, that Pershing's greatest victories were won single-handed over polished table tops against opponents who were generally known as his allied brothers in arms. However, let not this thought dim his glory, for the effects upon his country's history were greater than Second Manassas, Shiloh, and scores of other bloody fields.

General Harbord's account of the American Army in France is devoted principally to those portions of the Great Crusade in which he was involved. The narrative is not out of the ordinary in its main current, but here and there swirl eddies of scorn or wrath which, though cloaked in suave language, will make cooling blood leap in sclerotic veins, and should inject new life into the conversation at the Army and Navy Club. The events of our nineteen months of warfare are well known, and the book of an officer who was at all times at the head of affairs will receive due attention, but those readers who are familiar with the details of the American effort will feel a tinge of disappointment that so little space has been devoted to the fighting. Engagements with the enemy are hurried over and illustrated by maps that leave much to be desired. In the history of warfare the World War is the first of which complete records of the supply systems have been adequately preserved. The accomplishments of the Service of Supply are recited in these pages, and one gasps at the magnitude of the undertaking. Some noteworthy facts stand out, however: The nation, which in 1861-1865 introduced to war the use of railways on a large scale, had allowed the technique of their employment to die out in the Army, and 1917 found us with no Regular Army officers who knew "rail transportation technical and administrative requirements". The nation whose automotive industry is the most advanced of all countries on earth was never able to supply sufficient motor vehicles to its troops. Our effort was magnificent, but had the war continued could we have pursued our advantage across the Meuse? Supplies in October 1918 were alarmingly short; there was in truth a crisis at hand.

General Harbord is chary of awarding blame and he is lavishly generous with his praises, but his dislike for Marshall Foch is not concealed; it is one of the most interesting features of the book. Political interference with the business of the soldiers is one of the General's particular aversions. He takes care to point out the serious consequences that sprang from the

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one instance of President Wilson's lapse in this respect. And although the American Commander was given a free hand without precedent in a democracy, and firmly supported by the President and his great Secretary of War, it is brought to the attention of the reader that General Pershing was not consulted regarding the advisability of an armistice. This book should be read with care by those who are interested in military affairs, for its principal value lies in the incidental comments which are scattered through it from the first page to the last. Some valuable data are given in the appendices, and there is an index. J. M. E.

War Memoirs of Robert Lansing. New York: The Bobbs-Merrill Company. 1935.

As more and more diplomatic papers and hitherto state secrets, covering the years from 1914 to 1918, are revealed, and more and more of the memoirs of the men who were the moving figures of those years are published, divulging some of the behind-the-scenes conferences, conspiracies and compacts, the part played by the United States in that fateful part of the world's history is gradually becoming known in full. And it is a part marked—or, should one say, marred—by prejudices, personalities, propaganda, procrastination and pacifism, with a lack of real genuine patriotism and a thin sense of loyalty on the part of more than one official in a high place.

These memoirs of Mr. Lansing, who was Secretary of State during this critical period, are a valuable addition to these revelations and inquiries. The intimate and frank account of the diplomatic happenings of those momentous days makes fascinating reading for historian and general public alike. It is particularly an extraordinary revelation of the operations of the State Department.

Mr. Lansing succeeded William Jennings Bryan, who resigned as Secretary of State because his idealism could not support the President's neutrality program. Mr. Lansing became the head of the State Department on June 24, 1915. On July 11th, he confided some of his thoughts to a most astounding memorandum entitled "Consideration and Outline of Policies", which he explains by saying that having the settled conviction that this country would enter the war on the side of the Allies, he prepared for his own guidance this statement of our foreign policies on the hypothesis that the United States would join in the conflict against the Central Powers. In this document he proposes to settle the then present submarine controversy "because the American people are still much divided on the merits of the war", to keep a very watchful eye on all German activities in or near the United States and to pursue such a course as will insure "the actual participation of this country in the war in case it becomes evident that Germany will be the victor".

So antiGerman was Mr. Lansing, despite Mr. Wilson's desire to be ideally neutral, that he considers with horror the possibilities that Germany might change her submarine policy and might reverse the whole program. So great is his consternation over those possibilities that he naïvely asks: "Would not the United States have been forced to continue her unheeded protests to Great Britain for the many flagrant violations of international law by the British Navy? Would not the American people have become more and more irritated at the British disregard of their rights and demanded naval convoys or armaments for American ships engaged in legitimate trade with neutral countries bordering on the North Sea? Could a clash with the British Navy have been avoided? And would a clash have resulted in war?"

An early Victorian tone is given to the book by those paragraphs wherein Mr. Lansing frequently discourses on the awfulness of German autocracy, domination and oppression. Apparently, however, this same degree of autocracy, domina-

tion and oppression was altogether acceptable when it was accomplished and imposed by the British Navy.

While the book contains many official communications and extracts therefrom, it tells but little of what is not already known except the complete exposure of the processes of Mr. Lansing's reasoning and the artful way in which he finally persuaded Mr. Wilson to enter into "a war to end wars". It does, however, conclusively show how right and how wise Mr. Wilson was when, finally, he requested Mr. Lansing to relinquish his portfolio.

Nevertheless, the book is well written and is certainly well worth reading. The chapters on traffic in munitions of war, publicity and secrecy, and relations with Russia are particularly good. The descriptions of such exciting events as the recall of Dr. Dumba, the Zimmerman telegram, the Boy-Ed and von Papen cases, the visits of the several Allies' commissions and the resultant conferences are interesting in the extreme. The book closes with splendid word sketches of President Wilson, Arthur J. Balfour, Marshall Joffre, Count von Bernstorff, and others. R. M.

THE ILLUSTRATED WORLD HISTORY. Edited by Sir John Hammerton and Dr. Harry E. Barnes. Illustrated. New York: Wm. H. Wise & Co. 1935. $2.95.

FROM 4000 B. C. in Egypt and Mesopotamia to the New Deal in the United States and with the space of the whole World as its field, this book undertakes the ambitious project of narrating the principal historical events in world history in a little over 1100 pages. While the defects of all outlines are not absent here, the authors have attained a satisfactory degree of historical accuracy with certain novel features added that enhance the value of this particular volume among its fellows. The excellent maps, the unusual and numerous illustrations and the tables of dates preceding each chapter are noteworthy. As a handy reference book of universal history this volume is convenient and is available at small cost. D. A.

A RIFLEMAN WENT TO WAR. By the late Captain Herbert W. McBride. Marines, Onslow County, North Carolina: Small Arms Technical Publishing Co. $3.50.

Editor's Note: This book is considered to be so valuable in its presentation of fact and policy that two members of the Book Review staff were requested to present their opinions of it. The reviews follow:

This reviewer has read many a book on the World War and although too young to have participated in that conflict, he has nevertheless learned a great deal about it. McBride's book is the result of many questions asked him by his friends and associates and who had kept at him to prepare a book of his accounts and experiences during the year and a-half he spent with the Canadian Expeditionary Forces.

First of all, McBride was a soldier and secondly he had established himself as a rifleman in the United States long before the War started. He had had plenty of training in National Guard units, held a commission of Captain yet was so anxious to get into the conflict that he joined the Canadian Forces as a private and rose again to the rank of Captain. He served almost entirely with the 21st Battalion and after April 1917 returned to the United States to help train our own recruits. He stepped on many an officer's toes during this training period and did many things that were quite against the regulations but then he had seen war and knew what was wanted. After all the man who has been there knows a great deal more than any theorist ever will know.

I found that McBride's narrative rambled from one thing to another and was not arranged in a true sequence of things—but then this is a tale or rather *the truth* as it happened, when it happened and when he thought of such incidents as might

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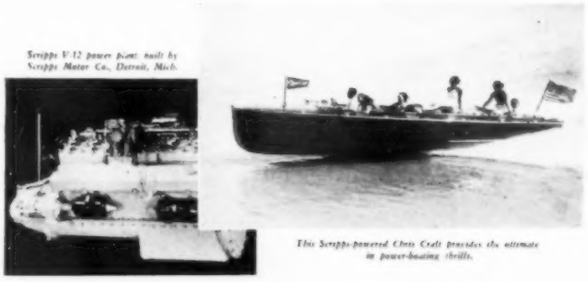

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interest the reader. He puts them down—you can like it or leave it! There is none of the glamor or the gruesome details glowingly described to instill upon the reader the idea of that well known phrase "The Horror of It." It is there, you realize it, can sense it. After all war is war and the soldiers participating in the fray are too busy taking care of the necessary things without bothering to see what is happening to the other fellow. Naturally, men who go to war and who see action at the front expect to see their comrades killed and wounded and get to the point where they are not at all surprised when they get theirs. It might bother some of the new men coming up but as long as they are kept busy and have work to do, there is little time to worry about the other fellow. These facts are so well brought out in this book that it makes one realize that other authors who have told the gruesome side of the story have done so at the insistence of the publishers and the public who want to hear it and read it. That's what sells a book and sales are what most publishers are interested in!

Chapters are devoted to the various exploits of the 21st Battalion of the Canadian Forces and especially to that section of which McBride was an active soldier. I say "soldier" although we knew him as a rifleman but by his own confession he states that there is little time for the rifle practice of the range, it is more the practice of the hunter after big game; the enemy, man. After all the enemy is likewise armed, has some good riflemen and probably as good a shot as those in our own forces and the successful one is the man who is the best hunter and locates his game first. There are a few chapters on the actual use of the various small arms in battle and how they differ from the actual range use of these weapons. It might be that the "gun crank" will only appreciate these chapters but it is really the action chapters that are interesting and the others, incidental. To be sure, weapons are talked about and described throughout the entire volume but the human side of the problem is the interesting side of the story. So human is the story that McBride seems to be beside the reader telling the story as he saw it. You ask questions as he continues and if you think of a question at some point do not feel hurt if it is not answered right then and there but continue reading and the answer will gradually out.

McBride was a machine gunner but when he found time he used the rifle and even the pistol much to the chagrin of the enemy. When he shot, if he missed—which wasn't often—it was time to duck and get out of the way because one might not be so fortunate the next shot. How he ever escaped being hit and killed was probably just his luck and we might all wish that he were still alive today to place before us another most interesting volume.

This reviewer has only one fault to find in the entire book and that not with the author but the publisher who on the last printed page (advertising) states "Captain McBride's narrative—A Rifleman Went to War, is one of a series of books published exclusively for riflemen and users of firearms—." Why the publisher thus narrows the field is difficult to see. Here is the best book ever to have been written on the war, limited as the area involved may be. It is to be highly recommended to civilians, both riflemen and non-riflemen, to all persons interested in our national defense. It is entertaining reading for everyone and a frank and candid outline of both Canadian and United States military operations of the war.

H. E. S.

THIS volume of the experiences of a Hoosier in the World War will doubtless arouse the ire of the Pacifist group because to the author "war is a game—the best game of all". But we doubt that they can find serious fault with the work if they carefully read it, because in spite of this attitude, McBride in no wise glorifies war. He points out all too vividly many of the gruesome and unpleasant features of service at the front.

A native of Indiana, quiet, soft-spoken, and modest, McBride

suffered all his life with the urge to be on the go. After years of experience in the National Guard, he went to Canada at the outbreak of the World War and was promptly commissioned a Captain in the 38th Battalion as Musketry Instructor. A little while later he found that the 38th was scheduled to garrison duty in Bermuda whereupon he resigned his commission and enlisted in the 21st Battalion and was assigned to the Machine Gun Unit. He served with this organization in Belgium and France, both as a machine gunner and later as an officer until the United States entered the war, when he returned to this country and served in our own Army. The book is full of comparisons of service with the British and service with the United States Army.

To those of us whose good fortune it was to know Herbert McBride, this book will be doubly welcomed, for it is to us that the book is addressed. It comes as a personal answer to the many questions that were asked of him after his interesting experiences abroad. It is written in such a style that it is not difficult to visualize his telling the story as he might do on one of those rare occasions when he was in a talkative mood—for this Hoosier marksman, who was always high up in the lists in the matches at Sea Girt and Camp Perry was modest, reserved and little given to story telling. But when conditions were right and he started reminiscing, none of the lucky few who might be present remembered their other engagements or worried about the loss of sleep if the tale ran on to the small hours of the night.

The book is an effort of the author to answer the many questions that were asked him regarding the seemingly insignificant things, the answers to which give a vivid picture of men at war. The volume is notably free of "sob-stuff" and dramatics that have characterized nearly all of the war stories and motion pictures—these things come in for deserved criticism as not being true pictures of things as they were.

The book should be of interest to many different types of readers, certainly to every one who is interested in rifle shooting. The Infantryman could read the book with interest because it covers most of the fine points of the art of sniping, of patrolling and scouting, coupled up with pertinent comments on weapons used by the Infantry in trench warfare. The discussion of the various kind of weapons used should also interest the Ordnance Officer. Even the General Staff might read and carefully consider the somewhat uncomplimentary comparisons of methods which we use and those used by the Canadians. McBride felt qualified to make such a comparison, having served with both armies. The discussion of the rum ration, while it will meet with the opposition of the probitionist, merits serious consideration!

The National Guard should be interested because it is the tale of one of their own who had served the various capacities in the 3rd Indiana, 1st Illinois Infantry, 2nd Indiana Infantry, Battery A of the 1st Indiana, (afterwards 27th Indiana Battery, Rainbow Division) and later in the 1st Ohio Artillery.

The civilian will get a real thrill from this book, particularly if it has been his good fortune to attend one or more National Rifle Matches at Camp Perry and Sea Girt, for the book frequently uses expressions peculiar to these ranges. McBride's comment about the difficulties of sniping in France, "On clear mornings we could do very little until the sun had lifted its glare out of our eyes; it was just like drawing one of the early relays at Sea Girt", cannot help but recall interesting days on that historic range.

The volume could, no doubt, be improved by some further editing as there is some repetition. But the reader will be impressed with the narrative which while interrupted at times to discuss an interesting sidelight, reaches a high level in the discussion of technique of scouting and patrolling and the description of the Battle of Saint Eloi is a vivid picture forcibly done and not soon forgotten. Who could regret the time spent reading and rereading this volume? H. M.

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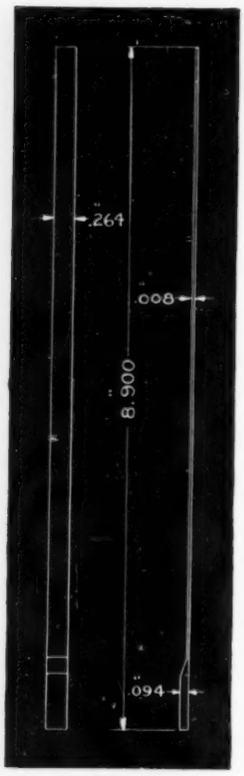

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SMALL-BORE RIFLE HANDBOOK. By Col. Townsend Whelen, Ord. Dept., U. S. A. Ret. New York: Sporting Arms and Ammunition Manufacturers' Institute. 1936.

THIS is a handbook intended for the beginner in rifle shooting. Close study of its pages will teach the reader to shoot for the book gives the principles on which good marksmanship is based. Concisely and accurately prepared, the text should bring proficiency as far as proficiency in rifle shooting can be brought by studying fundamentals. There are two other volumes to complement this handbook but neither will ever be published. Volume 2 is the actual target shooting at known distances wherein the reader learns to apply the principles of Volume 1. Volume 3—also never to be written—is the graduate course of practice shooting at more or less distinct objects and at varying distances where ranges must be estimated.

It goes without saying that any text prepared by Colonel Whelen is thorough and complete. This handbook is no exception to the author's past performance. He discusses with good illustrations the equipment necessary for small-bore rifle shooting describing the man-sized and smaller .22 caliber rifles using the long rifle rim-fire cartridge. Next he proceeds to a discussion of the cartridge itself indicating the several makes, types and trade names. Then he goes on to discussions of marksman's aiming, the firing positions, trigger squeeze, sight adjustment and range practice, slow fire, rapid and pursuit fire and field shooting. The latter portions of the work are devoted to care of the rifle, small-bore targets, small-bore rifle ranges and the place of the rifle club and the National Rifle Association among our shooting confraternity.

To do other than indicate in general terms the scope of this little volume would be quite impossible in a review. The simple fact is that Colonel Whelen gives here in the clearest and most concise fashion the complete story of small-bore rifle shooting. More than this would be superfluous. We recommend it in heartiest terms not only to those who are interested but to everyone who should be interested.

The Small-Bore Rifle Handbook has been prepared by the Institute for use and distribution by its members. Shooters not having contact with any arms and ammunition manufacturer may obtain copies by writing to the Sporting Arms and Ammunition Manufacturers' Institute, 103 Park Avenue, New York, N. Y., enclosing 15 cents in cash or stamps to cover the cost of mailing. Clubs, state rifle association, and other such organizations which may desire larger quantities may obtain them from the same source at a price of $11.00 per 100. O. E. D.

TWO ORDEALS OF DEMOCRACY. By John Buchan. New York: Houghton Mifflin Company. 1936. $1.00.

IN October 1924, the versatile historian and author, who has more recently joined us on this side of the Atlantic Ocean in the capacity of the Governor General of Canada, visited Milton Academy to lecture upon the Alumni War Memorial Foundation at that institution. His address on this occasion has now been made available to the public under the title, "Two Ordeals of Democracy". At this point his words should not be paraphrased; "My object is to illustrate the continuity of history. I want you to realize how, half a century before the Great War, you in America faced most of its problems and brilliantly solved them." This last sentence should be engraved in stone at the entrance of our staff colleges,—a clear and simple thought that happily has been brought home to us now by the efforts of a few straight thinking men, but there was a time when the fundamentals were forgotten while we listened to the clamor of continental sages. Mr. Buchan's address proceeds through a masterly outline of the Civil War to a discussion of Lee whom he ranks among the six Great Captains, and Abraham Lincoln whom he places with the world's greatest men. "That rugged face" the author is referring to the lat-

ter, "has become one of the two or three best known in the world. He has already passed into legend, and a figure has been constructed in men's minds, a gentle, humorous, patient, sentimental figure, which scarcely does justice to the great original. What I want to impress upon you about Lincoln is his tremendous *greatness*. Alone he took decisions which have altered the course of the world."

Another quotation may be pardoned since it contains a thought that is too frequently overlooked; "—the interest of war cannot cease, for with all its cruelty and futility it has a power of raising men to their highest and exhibiting human nature at its greatest. The Civil War will remain to most of us a perpetual fascination because of the moral and intellectual elevation of its leaders".

This little volume may be read through in a half hour; it is a distillation of the red corpuscles of democracy, a democracy that nourished leaders and all the qualities of manhood that might insure its preservation. Do not fail to read this book.

J. M. E.

THE PRESIDENTS IN AMERICAN HISTORY. By Charles A. Beard. New York: Julian Messner, Inc. 1935. $2.00.

THIS book, obviously written for young Americans of high school age, consists of a short biographical sketch of each of the Presidents of the United States, a digest at the end that may help the youngsters in cramming for examinations, and an introductory essay on the qualifications of the Presidents. As a quick reference it may provide the means to "save face" for a perplexed parent cornered by his enquiring offspring who demands a brief discussion of the administration of Millard Fillmore, a distinction between the Harrisons, or like factual matters that slip so readily from an elder's grasp. However, the title cannot fail to pique the curiosity of any one interested in American history, for the Presidents have been remarkably typical of their respective periods, and an absorbing book could be written by Professor Beard should he choose to use the lives of the thirty-two chief executives as pegs upon which to hang the narrative. J. M. E.

AUTOMATIC PROTECTION OF A. C. CIRCUITS. By G. W. Stubbings. Pittsburgh: Instruments Publishing Company. 1935. $5.00.

THE scope of this book embraces the very practical field of automatic protection of alternating electrical currents used so generally in industry today. The treatment is presented in logical manner in that a thorough discussion of the theory of protective transformers and their interconnections as well as the theory of protective release are described. The subject matter of the book falls into five main divisions: first, a discussion of protective transformers followed by analyses of the interconnection of these transformers to form protective circuits, relays, modern methods of protecting electrical machinery and transmission networks and the testing of relays and protective circuits. O. E. D.

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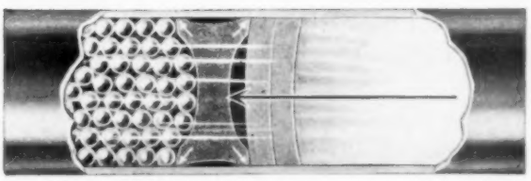

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